THE ROLE OF ACCENT IN THAI GRAMMAR

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ABSTRACT

The aim of this thesis is to investigate, within the framework of generative grammar, the role of accent in colloquial standard Thai. The result of this investigation has led one to conclude that accent in Thai is predictable by a series of phonological rules which have two functions in the language. One is the syntactic function since accent is used to distinguish utterances with identical phonological representations but with different syntactic structures; the other is the interpretative function in mapping the phonological representation of an utterance onto its phonetic representation.

This thesis is divided into three parts :-

Part One contains two chapters. Chapter One gives an account of the theoretical framework, followed by an outline of the aims and scope of the thesis. Chapter Two contains a review of previous works on accent or stress.

Part Two consists of three chapters. Chapter Three gives an account and the results of a recognition test of the contrastive role of accent. Chapter Four illustrates the syntactic role in the analyses of utterances used in the recognition test. The predictability of accent is described in Chapter Five in a series of accent placement rules.

The interpretative function of accent is described in Part Three which consists of three chapters. Chapter Six deals with the length assignment rules. Chapter Seven deals with the segmental feature assignment rules and Chapter Eight deals with the pitch feature assignment rules.

The thesis is then concluded with a summary.

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CHAPTER I

INTRODUCTION

1.0. The Theoretical Framework.

In the generative approach to linguistics as outlined by Chomsky and Halle,[1] a grammar of a language is the system of rules that represent the speaker-hearer's ability to determine the sound-meaning connection in an infinite number of sentences in that particular language. The term "grammar" as used by Chomsky and Halle has two references:[2] it is used to refer to the competence itself on the one hand, and to the explicit theory as constructed by the linguist to describe the speaker's competence on the other.

Grammar in the second usage, according to " The Sound Pattern of English ", has three subcomponents[3]: the syntactic component, the phonological component, and the semantic component. In this study, the author is concerned mainly with the phonological component; but since the input for the phonological component of a grammar is in fact, the surface structure which has been generated by the syntactic component and has undergone certain modifications by the readjustment rules[4], one should first describe the properties of the surface structure. The characteristics of the surface structure have been given by Chomsky as follows:[5]

> " The surface structures as generated by the syntactic component have the following characteristics. Each consists of a string of minimal elements that we will call 'formatives'. Each formative is assigned to various categories that determine its abstract underlying form, the syntactic functions it can fulfil, and its semantic properties... This information about formatives will be presented in a 'lexicon', which forms part of the syntactic component of the grammar... The full categorization of each formative is represented in the surface structure....

> The surface structure must indicate how the string of formatives it contains is subdivided into 'phrases', each phrase being a certain continuous substring of the string formatives. The analysis of strings into phrases is a 'proper bracketing' in the sense that the phrases can overlap only if one is contained in the other.... The phrases furthermore are assigned to certain categories, and this information may be represented by putting labels on the brackets."

The phonological component expresses the relationship between the surface structure of a sentence and its physical actualization insofar as this relationship is determined by grammatical rules. At this point, one must recognize two types of representations, namely the phonological representation and the phonetic representation. The phonological representation consists of phonological features with which each lexical item is entered in the lexicon under the phonological categories. The phonological features are classificatory distinctive features, operating on a binary system. For each phonological representation, there is one or more (as in the case of free variations) corresponding phonetic representations. The phonetic representation is not to be identified with the actual speech signal. The basic difference between the two is described by Chomsky as:[6]

> " The phonetic transcription... is ... not a direct record of the speech signal, but rather a representation of what the speaker of a language takes to be the phonetic properties of an utterance, given his hypothesis as to its surface structure and his knowledge of the rules of the phonological components.... The phonetic transcription, in this sense, represents the speaker-hearer's interpretation rather than directly observable properties of the signal." [7]

The phonetic representations are described in terms of phonetic features. But, unlike the classificatory phonological features which operate in a binary system, the phonetic features operate on a physical

scale in an n-ary system as determined by the rules of the phonological component.

1.1. The Aims and the scope of the thesis.

Within the theoretical framework outlined above, the author has set out to investigate the role of accent in Thai grammar. The term "accent" is used here to cover what other writers on Thai grammar have called "stress" among other things (for its definition, see p. 25). So far, no systematic account of accent has been given for the Thai language . S. Thawisomboon[8] using perception and intuition , and R. Noss[9] using volume, have found three degrees of stress while J.A. Gillette[10], using volume as well as duration, found 4 degrees of stress. Their findings,[11] however, are unacceptable here as their degrees of stress are not always phonologically contrastive; and hence fail to have any linguistic significance. On the other hand, E.J.A. Henderson,[12] V. Chanthavibul,[13] K. Nacaskul,[14] M. Haas,[15] H.A. Whitaker,[16] and A.S. Abramson[17] recognize two degrees of stress, namely stress and unstress. The first five of these authors have also remarked that there are certain types of syllables within the word boundaries and certain syntactic classes which are always unstressed. Their remarks suggest that stress or accent is predictable and, therefore, belongs to the phonological component of the grammar. The author has set out, in this thesis, to study the way in which the various degrees of accent are contrastive in Thai and the extent of their predictability. If it is proved that accent is predictable, one may then describe its predictability in a series of phonological rules. The phonological rules, according to the generative approach, would have two functions in the language. One function is to assign the correct degrees of accent to lexical items in given surface structures; the other function is an interpretative one which is to map the phonological representations of an utterance in a given surface structure onto their phonetic representations (see the definitions of the phonological and the phonetic representations on p. 6.). A marginal distinction, however, will be drawn between the two functions of this type of phonological rules by calling rules

which fulfil the syntactic function in assigning the correct degrees of accent to the lexical items "accent placement rules" and by calling rules which fulfil the interpretative function in mapping the phonological representations of the lexical items onto to their phonetic realizations, "phonetic realization rules". A review of earlier treatments of stress is given in Chapter Two. The syntactic function of the various degrees of accent is described in the three chapters in Part Two while its interpretative function is described in the three chapters of Part Three.

In writing a grammar which describes the native speaker's competence of his language, one is in fact, forming a theory about his competence. For such a theory to be scientific, it must be possible to match the statements in the theory up against some empirical observation and decide whether they are true of false,[18] or, in Chomsky's words,[19] a grammar must attain at least the level of descriptive adequacy. A grammar of the native speaker's competence, therefore, overlaps with the native speaker's performance in its application. The recognition test given in Chapter Three, which is an application of the author's theory about the role of accent in Thai, does provide an empirical test in that the author's competence of her language conforms with the competence of other native speakers. The overlap between competence theory and the performance of the native speakers has to be mentioned here ; because such rules as are formulated in this thesis are not only language specific, but also context sensitive in sofaras they have their application in only three styles of spoken Thai, namely the moderately fast style (or Allegretto), the fast style (or Presto) and the very fast style (Prestissimo). For the definitions of these styles, see (1) below.Any attempt to apply the rules to the performance of the speaker of other styles may lead to inconsistencies.[20] It is to be understood here that one of the environments for the application of the rules is the context of "colloquialism " which would be the name used to refer collectively to the Allegretto, the Presto and the Prestissimo

styles. This means that for the rules to apply accurately, one has to recognize levels of style. Impressionistic characterizations of four styles of spoken Mexican Spanish have been given by J.W. Harris[21] and their application may be extended to spoken Thai. The four styles and their characterizations are[22]:

(1) a. Largo: very slow, deliberate, over-precise; used, for instance, when trying to communicate with a foreigner with little competence in the language, or when correcting a misunderstanding over a bad telephone connection.

b. Andante: slow, careful, but unaffected; used when one is minding his p's and q's but not selfconsciously. Typical of, say, teaching a class or delivering a lecture in a large hall without electronic amplification.

c. Allegretto: moderately fast tempo, casual, colloquial. In many situations, one might easily alternate between Andante and Allegretto in mid discourse or even in mid sentence.

d. Presto: Fast, careless or "sloppy".

Although this thesis is primarily concerned with Allegretto and Presto, an even faster style, namely the Prestissimo, will be mentioned at the appropriate points. An example of the difference among the five styles may be shown in the pronunciations of /ˇmuan kan/ " also, as well" in (2)

(2)

Largo	[ˇmuan	kan]	[n] = [length 3][23]
Andante	[ˇmuan	kan]	[n] in [muan] = [length 1][24]
Allegretto	[muan	kan]	[n] = [length 1], pitch = high in [muan], = mid in [kan][25]
Presto	[muan	ŋan]	same as Allegretto as regards pitch and length.
Prestissimo	[m n̩	ŋ n̩]	same as Allegretto as regard pitch and length.

1.2. Distinctive features.

The term " distinctive features " will be used in this thesis to refer to the phonological distinctive features as opposed to phonetic

features at the phonetic level. Since both distinctive features and phonetic features are presented in this thesis in square brackets [ ] , it is to be understood here that any features within square brackets which are not present in the first column of TABLE 1.1. on page 14 , must be phonetic features and that all distinctive features are also phonetic features at the phonetic level. The basic difference between a distinctive feature and a phonetic feature lies in the fact that while the distinctive feature operates in a binary system with the feature values + and − , the phonetic feature operates in an n-ary system with the feature values 1,2,3,4 etc.[26] The analysis of the distinctive features for the segments is discussed under section (a) of this heading while the underlying theory for the analysis of the tones is discussed in section (b); but the actual analysis of the tones will not be given until Chapter VIII since in giving the analysis of the tones, one is in fact analysing the tones in syllables with [Accent 1] . The features used in the analysis, as admitted by Chomsky,[27] are still tentative and in the process of being revised.

(a) Segments.

By using the current literature on the subject,[28] segments in Thai have been analysed in terms of distinctive features. A fully specified analysis of the segments would contain much that is redundant. For instance, a segment which is [+nasal] in Thai must also be

[+sonorant
+voiced
−continuant
−syllabic
+consonantal
−aspirate
−round
etc..]

These redundancies may be predicted by segment structure redundancy rules which form parts of the lexicon[29]. The author will take it that the segment structure redundancy rules have already been given in the lexicon and will leave the feature entries blank, wherever they may be filled in by the redundancy rules, in her analysis of the segments

in TABLE 1.1. Certain points about the features which have, or have not, been used in the analysis should be mentioned here:

[syllabic] : The feature [vocalic] in The Sound Pattern of English has been replaced by the feature [syllabic] . The suggestion for this replacement has been made by Milner and Bailey as quoted by Chomsky and Halle[30] and the decision for the replacement is based upon the nature of the segments in Thai in which no segments other than vowels may be syllabic at the phonological level.[31] Since all the vowels and the consonants are already contrasted by the feature - or + [consonantal] , the feature [vocalic] becomes redundant. On the other hand, the difference between vowels in diphthongs and triphthongs lies in the fact that only one vowel, namely the first, bears the syllabic peak. Thus, one may distinguish the vowels, which are all [-consonantal] , by the feature [+syllabic] or [-syllabic] , depending on whether they function as the syllabic nucleus (i.e. bear the syllabic peak) or not. No articulatory correlate has yet been given for the feature [syllabic] and one may have to go back to Stetson's notion of the "chest pulse"[32] in which case, a segment which is [+syllabic] is the peak of this chest pulse. In a tonal language, a syllable may be defined as the tone bearing unit. But this definition does not apply to Woo's tonal analyses (see p17-p19 below) which assign no pitch height of a tone to the initial consonant or consonant cluster.

[length] : In this thesis, [length] is not one of the distinctive features although in traditional Thai grammar, it is treated as one of the suprasegmental phonemes to distinguish the difference between the socalled "short" and "long" vowels. Instead, this contrast is treated as the difference between a single vowel and a sequence of two identical vowels. This decision is taken in order to lighten the burden of the phonetic feature [length] at the phonetic level. After the treatment of the socalled long vowel as a sequence of two identical vowels, the phonetic feature [length] still operates in a five term system for the vowels, and in a three term system for the final consonants as shown in Chapter VI of this thesis. In traditional grammar, there is no value attached to the feature "length" other than the one already mentioned and since this function can be readily fulfilled by treating the "long vowel" as a sequence of two

identical vowels. It seems that such a treatment is fully justified.

[aspirated] : The feature [aspirated] has been postulated by the author as a feature which distinguishes the aspirated segments (which are [+aspirated]) from the unaspirated segments (which are [-aspirated]). From experiments carried out by Lisker and Abramson,[33] it seems that the articulatory correlate to the feature [aspirated] is the onset times of voicing of the following vowel after the release of the stop closure. A segment which is [+aspirated] is therefore produced with the voicing of the following vowel lagging considerbly after the release of the stop closure, while a segment which is [-aspirated] is produced with the voicing of the following vowel coinciding substantially with the release of the stop closure. This definition of the feature [+Asp] does not cover /h/ which is [+Asp]

One segment in Table 1.1., namely the glottal stop /ʔ/, requires some discussion here. As Abramson remarked, the status of the glottal stop is unstable.[34] Although it is predictable by phonological rules, it nevertheless behaves very much in the same manner as most other segments. The glottal stop is predictable in that it is usually present before a syllabic segment which is preceded by no other segment, as in /ˈʔɔɔk/ "to go out", and after a single vowel with [Accent 1] or [Accent 2] , which is followed by no other segment as in /ˈpaʔ/ " to be confronted with". This observation might suggest that the glottal stop should not be treated as a segment and that its presence in the places mentioned should be dealt with by two phonological rules which rewrite the zero element as a glottal stop at the appropriate places. On the other hand, there are two advantages to be gained in treating a glottal stop as a segment. First, in postulating the feature [syllabic] , generative phonology (in Thai) has done away with the notion of a syllable being a unit with its boundaries. Information about the syllable structures is given in the morpheme structure rules which are parts of the lexicon. If one recognizes a glottal stop as a segment, one may state the WORD structure in one rule:

$$\#\left(C\left(\left\{\begin{matrix}l\\w\end{matrix}\right\}\right)V\ (G)\left\{\begin{matrix}G\\C\end{matrix}\right\}\right)^{*}C\left(\left\{\begin{matrix}l\\w\end{matrix}\right\}\right)V\ (G)\left\{\begin{matrix}G\\C\end{matrix}\right\}\#$$

(G =nonsyllabic vowel.)

This rule is further restricted by segment sequence redundancy rules such as if /1/ is present, then the preceding consonant must be one of the stops. In treating a glottal stop as a segment, a presyllabic segment is therefore obligatory. The syllable boundaries are thus estabished by the rule above for whenever one comes across a sequence of two consonants (the glottal stop is also referred to as C since the term "glide" is reserved for the non-syllabic vowels.), the second consonant is the starting point of the next syllable. Another segment sequence redundancy rule will state that when a post syllabic glide is either /j/ or /w/, the glide will signal the syllable ending. The other advantage in treating the glottal stop as one of the segments lies in the tonal analysis. The tonal restriction in a syllable with a single vowel which is followed by a glottal stop is identical with the restriction on a syllable with a single vowel which is followed by a stop segment. That is to say, this type of syllable may have either a high tone or a low tone only. Thus the environments for this tonal restriction can be simplified if one treats the glottal stop as one of the segments; since the glottal stop and the other stops all share the features $\begin{bmatrix}-\text{continuant}\\-\text{nasal}\end{bmatrix}$. With this evaluation, the treatment of the glottal stop as one of the segments, in spite of its predictability, seems justified.

In our table on p. 14, /?/ and /h/ are [-sonorant]. Chomsky and Halle contradict themselves in SPE in their analyses of these two segments which, according to their definition of the feature [sonorant] (SPE p.302), should be [-sonorant] as both segments are produced with "constrictions more radical than those found in the glide [j] and [w] ". Chomsky and Halle however, class [?] and [h] as [+sonorant] in their Table 1 on p. 303 of SPE. The decision for treating /?/ and /h/ in Thai as [-sonorant] is due to the fact that in the analysis of a tone in terms of a sequence of pitch heights, according to Woo's theory (Woo,1969), each pitch height is assigned to each sonorant segment in the syllable; and since /?/ and /h/ have no inherent pitch, both being voiceless, they must be [-sonorant].

TABLE I.1

Distinctive Features (segments)

	b	d	p	t	k	pʰ	tʰ	kʰ	ʔ	ʧ	ʤ	ʃ	s	h	m	n	ŋ	l	r	i	e	ɛ	a	ɔ	o	u	ɯ	ɣ
sonorant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
syllabic									-											+	+	+	+	+	+	+	+	+
consonantal	+	+	+	+	+	+	+	+	-	+	+	+	+	-	+	+	+	+										
coronal	-	+	-	+	-	-	+	-				-	+		-	+	-	+										
anterior	+	+	+	+	-	+	+	-				+	+		+	+	-	+										
high																				+	-			-	+	+	-	
low																					-	+	+	+	-		-	
back																				-	-	-	+	+	+	+	+	+
round																				-	-	-	-	+	+	+	-	-
aspirated			-	-	+	+	+	-	-	+			+															
nasal	-	-	-	-	-	-	-	-						+	+	+												
lateral																		+	-									
continuant	-	-	-	-	-	-	-	-			+	+	+					-	+									
delayed release										+	+																	
voiced	+	+	-	-	-																							

(b) Tones

The analysis of Thai lexical tones in terms of distinctive features requires some discussion, as there are two theories to be considered and evaluated. One theory is W. S-Y Wang 's analysis.[37] In this theory, the tone, which is assigned to the vowel of the syllable , is analyzed in terms of a complex of some of the following features:

(3)

[high]	[contour]
[low]	[rise]
[mid]	[fall]
[central]	[convex]

The other theory has been proposed by N.H. Woo[38] who analyzes the tone into a sequence of same or different pitch heights, using the features :

(4)

[high tone]
[low tone]
[modify]

and assigning each pitch height to each sonorant segment of the syllable, starting from the first vowel (the syllabic nucleus). Wang's analysis has been rejected by the author because of the inadequacy in the theory itself. N.H. Woo has pointed out some of these inadequacies[39] which may be summarized as follows:

(i) By assigning the features to just one segment in the syllable, Wang's analysis ignores the basic relationships between dynamic tones and the sonorant clusters. That is, the fact that it is not possible to have a dynamic tone on a syllable which consists of just one sonorant segment.[40]

(ii) The values of the features [contour] , [rise] , [fall] and [convex] are peculiar. The sole function of Wang's [contour] feature is to differentiate the static tones from the dynamic tones. Its

value, on the other hand, is not independent of the features [rise] and [fall] ; for one cannot have a tone which has the feature [+contour] without also having the feature [+rise] or [+fall] or both. The feature [+contour] states that the tone is dynamic and the pitch range is given by the features [high] , [low] , [mid] , or [central] ; yet to be able to predict the direction and the motion of the tone, one needs to have the feature specifications [+rise] or [+fall] . Thus, the interpretation of the features [rise] and [fall] are somewhat peculiar; for one already knows from the specification [+contour] that the tone is dynamic. the features [+rise] and [+fall] only indicate the direction of the motion; or, in another word, their function is to order the realization of the feature [+high] . That is , if the tone is marked $\begin{bmatrix} +\text{contour} \\ +\text{high} \\ +\text{rise} \end{bmatrix}$ the high pitch must not be realized until the end of the production of the tone. Or, if the tone is marked $\begin{bmatrix} +\text{contour} \\ +\text{high} \\ +\text{fall} \end{bmatrix}$, then the high pitch must be realized immediately at the beginning of the articulation of the tone and a non high pitch at the end. Wang's system therefore uses an <u>implicit</u> ordering device.

(iii) Wang claimed his features to be distinctive; one thus expects the features [+rise] and [+fall] to be mutually exclusive in his system. But Wang's tone 12 and 13 can be both [+rise] and [+fall] . Moreover, in these two tones, the features [+rise] and [+fall] must also be ordered to produce the tonal configuration ^ or v . To do this, Wang introduces the feature [convex] as another ordering device. A [-convex] tone first falls and then rises; while a [+convex] tone first rises and then falls. The feature [convex] has no interpretation unless the tone is also marked [+rise] and [+fall] . Wang's system of features then contains, not just features determining the order in which the pitch heights are to be realized, but

also a feature determining the order in which the ordering features are to be realized.

(iv) Although Wang claimed that his features are distinctive, yet, unlike the distinctive features which have been established for segments, there is no immediate articulatory correlate to his features, which specify neither source, location nor manner of articulation. The only specification given is the order in which the actions defined by other features in a specific matrix will be performed.

The alternative theory has been proposed by N.H. Woo and is adopted by the author in analyzing the Thai tones. In this theory, the distinctive features of tones are the features of pitch height, namely:

(5)

[high tone]
[low tone]
[modify]

In order to avoid the confusion between these features and the Thai lexical "high tone" and "low tone", Woo's features [high tone] and [low tone] will be referred to as [highT] and [lowT] respectively. The articulatory correlates to these features are :

(6)

> " HighT -- non-highT HighT sounds are those produced with the vocal cords longer, tenser, and less thick than the neutral position. In addition, the glottis is raised above the neutral position. Non-highT sounds are produced without the raising of the glottis, and without lengthening or tensing or decreasing the mass of the vocal cords.[41]
>
> LowT - non-lowT LowT sounds are produced with the vocal cords shorter, laxer, and thicker than in the neutral position. In addition, the glottis is lowered below the neutral position. non-lowT sounds are produced without the lowering of the glottis, and without the shortening, laxing and thickening of the vocal cords.[42]

Modify - non-modify A modified sound is one produced with the vocal cord and larynx configuration of either a high toned sound or a low toned sound and is one in which either the configuration of the pharynx has been changed, or the manner in which the vocal folds vibrate has been changed, or some other mechanism has been employed to change the"normal"waveform of the pitch produced. The normal waveform referred to is that associated with the pure high toned or pure low toned sounds. A non-modified sound is produced without the change in waveform.[43] "

Since the account of the articulatory correlates to N.H. Woo's features, as quoted in (6) from her thesis, presupposes one's knowledge what the neutral position is, the account of the neutral position, given earlier in her thesis[44], is reproduced in (7) :

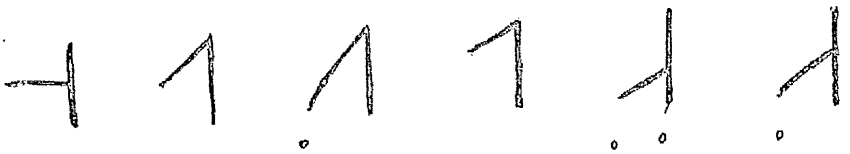
(7) "..these two feature([highT] and [lowT]) can be used to characterize a raised and lowered position of the glottis relative to some neutral rest position in a completely analogous manner to the segmental features [high] and [low] , which refer to theposition of the body of the tongue relative to some rest position. The neutral position for the body of the tongue is described in SPE as raised and fronted, approximately the configuration found in the vowel /e/ in English 'bed.' In a similar manner, we assume the neutral position of the glottis, the thickness and the tension of the vocal cords,. to be found in the production of the 'natural pitch' for any given speaker. Zemlin describes this 'natural pitch' as somewhere around 'middle C' (C_4) for female speakers, and somewhere about an octave lower, C_3 , for male speakers. From various studies on pitch and pitch variability, this 'natural pitch' is found to be approximately one quarter up the total singing range, including falsetto. When any speaker is engaged in relaxed phonation, his voice may produce a variety of tones ranging in pitch over approximately two octaves. Generally, however, these pitches are distributed so that a central tendency, is observed. This mode, or central tendency, is what we call the 'natural pitch' or 'habitual level'.

The tones, in Woo's theory, are presented as sequences of these

features, each one of which is uniquely associated with some sonorant segment. This, in other words, means that a syllable with one sonorant segment will have one pitch height; a syllable with two sonorant segments will have two pitch heights and so on. If the pitch heights are of the same level within the syllable boundaries, then the pitch of that syllable is realized as a long level tone. If the pitch heights of the sequence differ, the pitch of that syllable is realized as a contour tone and the direction for the motion is instructed by the order in which the pitch heights are to be realized. TABLE 1.2.[45] demonstrates how the different pitch contours are specified with respect to these features. Each column is understood to be part of the feature matrix of some sonorant segment.

TABLE 1.2.

highT	+	+	−	−°	−	+ +	− −
lowT	−°	−°	−	+	+	−° −°	+ +
modify	−	+	−°	+	−	− −	− −



highT	−	−	−	+	−°	+	+	+	−°	−°	−°	−°
lowT	−	−	−	−°	+	−°	−°	−°	+	+	+	−
modify	−°	−°	−°	−	−	−	+	−	−	+	+	−°

highT	−	+	+	−	−	−°	+	+	+	−°		
lowT	−	−°	−°	−	−	+	−°	−°	−°	+		
modify	−°	+	−	−°	−°	−	−	+	−	−		

highT	−	−°	−		−°	−°	−				
lowT	−	+	−		+	+	−				
modify	−°	−	−°		−	−	−°				

(The superscript (°) signifies that the entry is redundant as it may be predicted by redundancy rules, see (8) on page 21.)

The redundancy rules for these features are as follows:

(8)

(1) [+highT] ——→ [-lowT]

(2) [+lowT] ——→ [-highT]

(3) $\begin{bmatrix} -\text{highT} \\ -\text{lowT} \end{bmatrix}$ ——→ [-modify]

Rules (1) and (2) state that a pitch cannot be simultaneously high and low. Rule (3) states that the secondary feature [modify] cannot be specified as + unless the matrix is also specified as either [+highT] or [+lowT] . The superscript ($^{\circ}$) has been added by the author to Woo's table, reproduced on page 20, to indicate the entries which should have been left blank, since they are predictable by these three redundancy rules.

There are, however, certain weak points in Woo's analysis:

(i) In her theory, one pitch height is assigned to each sonorant segment of the syllable. This means that one may not have a contour tone on a syllable with just one sonorant segment, namely the syllable with a single vowel followed by a voiceless stop segment. In Thai, however, there are few lexical items such as /^khak / "murky", /^tcak / " the sound of the rain ", /^tup ^tap / " to thump with one's fist " , which all have the falling tone and yet, there is only one sonorant segment in the syllable. It seems that these exceptions contradict Woo's theory which provides no suggestion as to the way the tones of these lexical items are to be realized. However, it should be mentioned also that this type of syllables is rare, that the items in question, in all cases are onomatopaeic, and that there are no other lexical items in the language (with one exception) which contrast with these syllables by the difference between a single vowel and a geminated vowel. The exception is /^lak / in /^lɣ k ^lak / " to look startled" which does contrast with /^laak / " to tow " . These findings suggest that one may, on the one hand, postulate the feature "phoaesthetic" to be entered in the lexicon

under each of these lexical formatives. The feature [phonaesthetic] would then give the instruction that the lexical formatives in question are not subject to the phonological rules which assign the pitch heights to the lexical items; but are subject to rules in a separate system known as " Phonaesthetic ". On the other hand, one may treat these lexical items as having a sequence of two vowels in their underlying forms, one of which is deleted by a rule after the pitch heights have been assigned. If the second suggestion is taken, then / ^lak / has to be entered as an exception.

(ii) In Woo's analysis of the Mandarin tones,[46] the " third " tone poses a problem. This tone has the pitch configuration ∨ and should be analyzed as :

(9)

highT			−
lowT	+	+	−
modify	−	−	

The initial drop in the pitch contour has been treated as being non-distinctive by Woo, as

> "..it is the natural consequence of the articulatory machanism involved in producing the following low level tone." [47]

The Mandarin third tone resembles the Thai rising tone in its configuration, with one difference: the Thai rising tone ends with a pitch height in the [highT] region (see Fig. 8.1.) and may be analyzed as :

(10)

highT			+
lowT	+	+	
modify	−	−	−

The syllables which may bear this tone on both languages are :

(11)

$$C\ (\ )\ V\ (\ )\ \begin{Bmatrix} \cdot \\ N \end{Bmatrix}$$

The fact that the maximum number of the sonorant segments for these syllables

is 3 , is the reason for the analysis of each of these tones as a sequence of three pitch heights. But, as shown in (11), it is also possible to have these tones on syllables with just two sonorant segments. Should one then recognize an optional pitch height (presumably the first) so that for the syllables with only two sonorant segments, there will be only two pitch heights present, or, should one take into account the length situation and recognizes that all the three pitch heights are obligatory, at least in these two particular tones ? For it is a well khown phonetic fact that the duration of the final consonant (in this case, the nasal) is in reverse proportion with the number of the preceding vowel(s). That is if the vowel is short, the duration of the final consonant will be long, and, if the vowel is long, the duration of the final consonant will be short. Thus, the duration of the whole syllable is more or less the same whether the vowel is long or short. This fact is borne out by the measurements shown in Tables 6. 7-10 in Chapter VI. The same relationship exists between syllables with two vowels and syllables with three vowels (see Tables 6.1-6 .). The geminated vowels in an open syllable have the duration of 4/3 to the same vowels which are followed by another vowel or a consonant. The duration of the final non-syllabic vowel after a single vowel has been found to be 3/2 in comparison with its duration after geminated vowels. These observations suggest a rule as in (12)

(12)

$$V \quad \begin{Bmatrix} V \\ C \end{Bmatrix}$$

$$1 \quad 2$$

$$1 \quad 2 \longrightarrow 1 \quad 2 \quad 2 \; / \underline{\quad\quad}_{\text{Accent } 1}$$

which would give (13)

(13)

V	V	⟶	V	V	V
V	j	⟶	V	j	j
V	w	⟶	V	w	w
V	N	⟶	V	N	N
V	S	⟶	V	S	S

Woo however, rejected this proposal, having found that the final pitch height of the Mandarin third tone is highly susceptible to tone sandhi, since it seems unjustified to have a rule which rewrites a sequence of two sonorant segments as a sequence of three sonorant segments for just one type of syllable, namely a syllable with the third tone.[48] However, since no comparable tone sandhi seems to exist in Thai and since the length situation holds regardless of which tone a syllable may have, the author, in her analysis of the Thai five tones, which will be given in Chapter VIII, will follow the treatment which has just been outlined. Moreover, rule(12) has another value, for it solves a problem which has not even been mentioned by Woo. That is, if one analyzes all the tones as a sequence of two pitch heights, as in Woo's theory, there would be no phonetic instruction as to how these two pitch heights are to be distributed in syllables with three sonorant segments, namely the open syllable with a triphthong, and the syllable with geminated vowels followed by either another vowel or a nasal. Rule (12) would solve this problem, if, one also allows that in the analysis of a tone as a sequence of pitch heights, some of these pitch heights may be optional. The presence of the optional pitch height will depend on the maximum number and the minimum number of the sonorant segments in the types of syllables which may carry that particular tone. The topic of optional pitch heights in a tone is discussed more fully in Chapter VIII with their illustrations. In recognizing the optional pitch height of a tone, one does partially explain the reason for the variations of the pitch contours of the same lexical tone, or what are know traditionally as "allotones". (The other reason, also discussed in Chapter VIII, is the influence of the segments which surround the syllabic nuclei.)

1.3. Syntax.

Syntax comes into this study in sofaras the Accent Placement Rules operate on the surface structure which is in fact the syntactic analysis of the utterance. In PART TWO where the contrastive function of accent is investigated, syntax plays a great part. Two major works

have been used as the framework on syntax in this thesis : V. Chanthavibul : Inter-Sentence Relations[49] and U. Warothammasikkhadit : Thai Syntax, an outline[50]. However, since the two authors sometimes use different terminology for the categories, a list of the categories which appear in this thesis will be given with their examples in Chapter V.

1.4. A Definition of Accent.

In The Sound Pattern of English, stress is one of the phonetic features. It has been defined as :

stress sounds produced with higher intensity, raised pitch and greater duration of sonorants. (underlined by author of this thesis).

Such a definition therefore does not fit very readily into the phonology of a tone language. On the other hand, if one defines stress in terms of intensity, it has also been found that certain lexical items (the pronouns / ˇkhaw / "he,she", /ˇtchan / " I ", / ˇphom / " I, male.") which are unaccented and underwent the tone changing rules for the unaccented syllables may also be stressed in an emphatic context. A more abstract term " Accent " has therefore been proposed by the author as a phonetic feature in Thai and may be defined as :

[Accent] is a prosodic feature operating in an n-ary system as required by the phonological rules of the Thai language. The lesser degree of accent a syllable bears, the more changes there would be with regard to the segmental features, the length features and the pitch contour of that syllable, from its lexical representation form. An accented sound is usually produced with higher intensity and greater duration of sonorants; but in certain contexts where the changes in the pitch contour already give a strong cue for the fact that the syllable is unaccented, the intensity and the duration may become redundant

1.5. Notation.

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(a) Tone markers.

The following symbols are used in marking the tones:

(unmarked) for the mid tone.
(˨) for the low tone.
(˦) for the high tone.
(˥˩) for the falling tone.
(˩˥) for the rising tone.

These markers are used in the lexical representations of both accented and unaccented syllables in spite of the change in the pitch contour in the latter as the pitch contours they change into are predictable by tone changing rules, if their lexical tones are given. The tone of the unaccented syllable is left unmarked in the phonetic representations which are always given with their corresponding lexical representations.

(b) Accent markers.

Accent markers are not usually given in the lexical representations since the degree of accent for the formative is predictable by Accent Placement Rules. However, where there is a need to show the contrastive degrees of accent on certain lexical items, the superscripts 1,2,3, and so on will be placed above the syllabic nucleus of that particular lexical item to indicate its degree of accent with the superscript (^{1}) indicating the most accented syllable. In stating the environments for the phonetic realization rules, [Accent 1] and [Accent 2], are used to indicate the primary degree and the secondary degree of accent respectively; while [unaccented] are used in referring to all other degrees of accent.

(c) Boundary markers.

/ / indicates that symbols within its boundaries have the systemic phonemic value. That is, the symbols are abbreviations for some features complexes. Example:

$$/p/ \longrightarrow \begin{bmatrix} -\text{aspirated} \\ -\text{voiced} \end{bmatrix}$$

[ ] (i) indicates that the symbols entered within its boundary have a general phonetic value. Example :

/ ˇnaj / ----> [najj]

[ ] (ii) indicates that the symbols entered within its boundary belongs to a certain syntactic class. Example:

N [ˇmaa] N

[ ] (iii) indicates that the phonological rule in question applies to the symbols within its boundary in a conjunctive order. Example :

$$X \longrightarrow Y \Big/ \left[\begin{array}{ll} \_\_\_\_ & Z \\ A & \_\_\_ B \end{array} \right]$$

{ } indicates that the phonological rule in question applies disjunctively to the symbols within its boundary. Example :

$$X \longrightarrow Y \Big/ \left\{ \begin{array}{ll} \_\_\_\_ & Z \\ A & \_\_\_\_ B \end{array} \right\}$$

" " indicates that the item within its boundary is an English translation of whatever precedes it. Example :

/ ˇmaa / " a dog."

indicates, only where it is necassary, the word boundary. Example:

$$V \longrightarrow [\text{Accent 1}] / \# \; XYZ \_\_\_\_ \#$$

( ) indicates that the item within its boundary is optional.

(d) Miscellaneous markers.

( )* indicates that the item in the brackets may be repeated infinitely. Example:

$$(C \; V)^{*} \; C \longrightarrow \left\{ \begin{array}{l} C\ V\ C \\ C\ V\ C\ V\ C \\ C\ V\ C\ V\ C\ V\ C \end{array} \right\} \text{ etc..}$$

* indicates that the lexical item is a proper name. Example:

/ ^thii ˋkɣɣt* / " Kerd's land."

/p,t,k,/ are used as symbols for the final as well as the initial bilabial, alveolar and velar voiceless stops respectively.

/tc, tch / have the same phonetic values as [tɕ] and [tɕh] in the I.P.A. Chart.

/j,w/ are used to represent the non-syllabic /i/ and /u/ respectively.

Other symbols not defined here have the same values as stated in the I.P.A. Chart unless their sources are stated.

1.6. Instrumental Aids.

Four instruments have been used for the acoustic analysis of the linguistic data in this thesis namely :

a) The wide band of the Sound Spectrograph.
b) The Mingograph, model 800.
c) The Pitch Meter.
d) The Intensity Meter.

A detailed description of these instruments will be given in the appendix.

Footnotes I.

1. Chomsky N. and Halle M. : The Sound Pattern of English, (1968).

2. Chomsky and Halle, op. cit. p. 3.

3. Chomsky and Halle, op. cit. pp.6-7.

4. For the discussion on readjustment rules, see SPE , pp. 371-2.

5. SPE pp.7-8.

6. SPE p. 294.

7. An example for the difference between the speaker-hearer's interpretation of an utterance and its physical properties has been shown by Lieberman's experiment on the perception of English stress. It has been found that given no other cue than the auditory one, only two degrees of stress may be identified by even trained linguists. When information about the syntactic and semantic properties of the utterances were made available, the informants could identify more degrees of stress. The informants' ability to identify the various degrees of stress is based therefore, not only on the physical properties of the utterance, but also on their knowledge of the grammar of the language. Word 21 , No.1 , p.40-54 (1965)

8. S. Thawisomboon: Syllable Junctions within Stress Groups in Spoken Thai, London U. unpublished M.A.'s thesis (1956).

9. Noss R. Thai Reference Grammar, (1964)

10. Gillette J.A. : Prosodic Features in Bangkok Thai, Georgetown U. unpublished M.A.'s thesis, (1955).

11. The works by these three authors are discussed in Chapter II of this thesis.

12. Henderson E.J.A.: "Prosodies in Siamese", Asia Major, new series 1 (1949), pp. 189-215.

13. Chanthavibul C.: Inter- Sentence relations, London U.Ph.D thesis (1964), published in 1971 in its modified version. The references are taken from her Ph.D thesis, and not the published book.

14. Nacaskul K. : A Cognate Study of Cambodian and Thai Words, London U unpublished M.A.'s thesis, (1964).

15. Haas M. Thai - English Student Dictionary, (1965) Stanford University Press.

16. Whitaker H.A. :" Stylistic Tone Changing Rules in Spoken Thai ", Glossa, Vol.3, pt. 2 (1969) pp.190-8.

17. Abramson A.S. : The Acoustic Measurements of Vowels and Tones in Standard Thai, (1962)

18. See Bach E.: An Introduction to Transformational Grammar, (1964) p. 11.

19. Chomsky N. : Current Issues in Linguistic Theory (1964) p. 29.

20. A classic example is the distinction between /l/ and /r/. This distinction is made by speakers of Largo and Andante; but the distinction is lost in the faster styles in which /l/ is used for both segments. See also Abramson's remark on this topic as quoted by the author in Chapter VII, p. 120-121.

21. Harris J.W.: Spanish Phonology, unpublished Docteral Dissertation, M.I.T. (1967).

22. Harris J.M. : Spanish Phonology, op. cit. p. 8.

23. See Length Assignment Rules in Chapter VI.

24. See Length AssignmentRules in Chapter VI.

25. see Pitch Assignment Rules in Chapter VIII.

26. In more recent works on generative phonology, there has been some discussion about the introduction of the n-ary system at the phonological level, especially in the analysis of the vowels. The author has not found this to be necessary since the three vowels which might have posed a problem namely /ɛ/, /a/ and /ɔ/ are distinguished from one another by the features [back] , [round] (see Table 1.1.). While /ɛ/ is [-back] , /a/ is [+ back] ,

27. SPE. p. 302.

28. a) Thawisomboon S: op. cit. pp. 4 - 18.
b) SPE, p. 298-329.
c) Abramson A.S. : The Acoustic measurements of Vowels and Tones in Standard Thai.
d) Lisker L. and Abramson A.S. : A Cross-Language Study of Voicing in Initial Stops. Word, 20, 384-422.

29. See Stanley R.: " Redundancy Rules in Phonology," Language, 43, no. 1.

30. SPE. p. 302.

31. At the phonetic level, the nasals may also be [+syllabic] . See Chapter VII.

32. See Stetson R.H. : " Motor Phonetics", Archives Neerlandaises de Phonetique Experimentale , III, (1928).

33. Lisker L. and Abramson A.S. , op. cit.

34. Abramson A.S. : The Acoustic Measurements of Vowels and Tones in Standard Thai, p. 4 .

35. The feature [sonorant] is in fact redundant here since all segments which are [+nasal] and all segments which are $\begin{bmatrix} \alpha\text{syllabic} \\ -\text{consonantal} \\ +\text{voiced} \end{bmatrix}$ must be [+sonorant] . However, in SPE, some sort of hierarchy among the features is implied, but not estabished. This does pose a problem in the formulation of the redundancy rules since one can predict

the major class features from the minor class features. Until the hierarchy among the features has been established, the author will take this to be the procedure. The entries for the feature [sonorant] are present here in spite of their being redundant (indicated by the brackets) because they are essential in the tonal analysis.

36. See Note (26) above.

37. Wang, S.-Y.: " Phonological features of Tones," I.J.A.L., Vol. 33 (1967).

38. Woo N.H. " Prosody and Phonology," M.I.T. Ph.D. thesis. (1969)

39. Woo. N.H. op. cit. pp 70 -78.

40. This statement is in fact not true since in Thai, there are syllables with only one sonorant segment which bear a falling tone. See. p.21.

41. Woo N.H. op. cit. p.244.

42.

42. Woo N.H. op. cit. p.245

43. Woo N.H. op. cit. p. 253.

44. WooN.H. op. cit. pp. 240-242.

45. Reproduced from Woo's TABLE 3.1. on p. 85.

46. Woo N.H. p. 86.

47. Woo N.H. p.86.

48. Woo N.H. pp 86-92.

49. Chanthavibul V.: op. cit. Ph.D thesis, University of London.(1964).

50. Warothammasikkhadit U. Thai Syntax, An Outline. Prasaanmitre, Bangkok.

CHAPTER II

A REVIEW OF OTHER TREATMENTS

2.0 In the preceding chapter, the author mentioned certain works which have an indirect or direct bearing on what the author calls "accent," but which has been referred to by the authors of these works as "stress." The reason for the author's preference of the term "accent" to "stress" has already been given in 1.5 on page 25. In this chapter the author will look at 4 major works on the subject, namely:

S. Thawisomboon: Syllable junctions within stress groups in spoken Thai. (1956)

J.A. Gillette: Prosodic features of Bangkok Thai. (1955)

R. Noss: Thai Reference Grammar (1964)

H.A. Whitaker: "Stylistic tone changing rules in spoken Thai" (1969)

The term "stress" will be used in the exposition and evaluation of their works.

2.1 Thawisomboon's work is really a study of the relation of stress and rhythm in syllable groups to the other properties of syllables and the characteristics of certain syllable junctions (i.e. the way syllables are linked together) in Thai utterances. His remark:

> "It is hoped that this study of junction prosodies will help the grammarian to confirm his grammatical analysis of the Thai language," [1]

seems to suggest that his only aim was to achieve the level of observational adequacy. That is, his statements are descriptions of such features as stress and junctions in particular utterances spoken at one time by one particular speaker in one particular style namely the "slow colloquial style." [2] The descriptions as such were not in any way based on the grammatical analysis of the utterances.

According to Thawisomboon, three degress of stress are to be taken into account: full stress, secondary stress and weak stress, which

are marked by ", ', and , respectively. The main criterion used in judging the three degrees of stress is his own perception and intuition, although some attempts have been made to correlate the three degrees of stress with more objective criteria on the articulatory and auditory basis. The result of the attempt, as concluded by Thawisomboon, is as follows: [4]

> ".....Such attempts have met with only limited result.... It has been found that a palatogram of a weakly stressed syllable in an utterance may show a narrower wipe than that of a fully stressed syllable or a syllable with secondary stress in another utterance. Sometimes the "wipe-off" of the weakly stressed syllable shows only a spot or spots. This appears to indicate that the contact in such cases is less firm than for more strongly stressed syllables..... No difference has, however, been observed between the wipes-off of syllables with secondary stress and those with full stress.
>
> A kymogram showing the mouth and larynx tracings of the utterance: ,ta: 'sùk 'pa: "ka: (Old Sook's throwing (stones)at the crows) shows that the syllable with secondary stress 'pa: is shorter than the fully stressed syllable "ka: and that the weakly stressed syllable ,ta: is the shortest. This appears to indicate that there is some correlation between the degree of stress and the relative duration of the syllables concerned.
>
> To sum up, while it is in some cases possible to correlate the degree of stress with such objectivity measurable features as the actual duration of the syllable and the firmness of the contact of the articulating organ, the deciding factor in determining stress must still be what is "felt" and "heard" by the native speaker of the language."

Let us now look at the distribution of Thawisomboon's full stress, secondary stress, and weak stress in his examples of stress groups. For the sake of conformity, transcriptions have been converted into the author's system except the tone markers are placed above the vowels.

Full stress.

The author agrees with most of Thawisomboon's assignment of full stress, except in the following utterances on p.21-29 of his thesis.

(1)

7a	28a
7b	29a
11b	34a
12a	34b
17b	36a
24a	38a
26a	

where she finds that it is possible to replace the full stress by a weak stress. Only two examples of these utterances will be given here:

7b: ˌsàʔ ˈnə̀k "dii "It's very amusing."

28a: ˈjàak ˌtɕàʔ ˈpaj ˌmɯ̌an "kan "I should have liked to go."

The full stress on the lexical items in question may occur in these utterances, but only when the speaker wants to lay an emphasis on the lexical items which are either a verb modifier, a postV or a sentence final particle. (See the minor set of categories, Chapter V, in this thesis.)

Secondary stress.

The author finds that it is possible to replace Thawisomboon's secondary stresses other than those listed under (2) and (3) below by full stress. Two examples will be given here:

1a: ˈ mɯ̌u "phɛɛŋ "Pork's dear."

4a: ˈ mɛɛw ˈ kin "plaa "The cat is eating the fish."

It seems that Thawisomboon assigns a full stress to the last stressed syllable before a pause, and a secondary stress to all stressed syllables in non-phrase final position. There is some evidence to support his analysis since the duration of the stressed syllable in phrase-final position is always relatively longer than other stressed syllables in the same utterance. However, this lengthening also takes place with unstressed syllables in the phrase final position. (see Examples under (4)). The author feels that this lengthening phenomenon in the syllable before a pause is related to intonation rather than to stress. Moreover, duration need not be the only correlation to stress. Recall the quotation earlier

on, where Thawisomboon admitted that he had not observed any difference between the wipos . of syllables with secondary stress and those with full stress, [5] and the author feels that this failure may be due to the fact that some of Thawisomboon's syllables with a secondary stress are in fact fully stressed syllables which, because they occur in the non-phrase final position, are not affected by this lengthening process. The longthening process is discussed in greater detail under 5.6 in Chapter 5 in connection with Accent placement rules in a phonological phrase, on p. 86-87 below.

The author agrees with Thawisonboon's assignment of secondary stress in the following utterances:

(2)

16a: ˌtɕàʔ ˈpaj kʰɔ̂ "paj "All right, we will go."

22a: / plaa/ in
ˈjàak ˈkin ˈplaa ˌkàʔ "phoŋ "I'd like some bream."

25a: / khon/ in
ˈnâa ˌsǒŋ ˈ sǎan ˌkhon "tɕèp "I feel sorry for the patient

/ ˈpaj/ in 16a is the non-final reduplicated form of the verb phrase VP [PreV[tɕàʔ PreV][Vi[paj] vi]VP "will go" ; /ˈplaa/ in 22a is the non final morpheme in the compound noun N [N[plaa]N][N[kràʔphoŋ]N] N, and thus also receives a secondary stress (see 5.2) and the same may be said of /khon/ in 25a, although in the Presto and prestissimo, styles it is likely to be unstressed as it has the right environment for the operation of the Rule for institutionalised compounds (seeChapter V, p. 80)

In the following utterances, Thawisomboon assigned a secondary stress to lexical items which, in the author's opinion, would have a weak stress,

(3)

8b: /ˌdii "tɕaj ˈmǎj/ "Are you pleased?"

10a:

/ˈwanˌníi ˈdɛ̀ɛt "rɔ́ɔn/ "The sun is hot today."

/mǎj/ in 8b is a final question particle and is never stressed although its duration may be long due to the lengthening process in syllables in the phrase

final position mentioned earlier. /wan/ in 10a is the non final morpheme of the institionalised compound /wan níi/ "today" and should, by rules in Chapter V, be unstressed.

In the utterances listed under (4) Thawisomboon assigned a secondary stress to lexical items which, in the author's system, would have either a full stress or a weak stress, depending on the context being emphatic or not.

(4)

(i) 5a:

/ ˌmɛ̌ɛ "rɔ́ɔn 'tɕaŋ /

"Oh! It's very hot!

5b:

/ 'paj "nǎj 'maa /

"Where do you come from?"

8a:

/ ˌʔàʔ "raj 'kan /

"What's the matter?"

10b: / 'tɕhǎn 'tʃhɔ̂ɔp 'líaŋ "mɛɛw/

"I like keeping cats."

11a:

/ 'rót'lêɛn "tʃháa 'tɕiŋ /

"The bus is going very slowly."

(ii)

13b:

/ 'khǎw ˌtɕàʔ 'tɛ̀ɛŋ "pleeŋ /

"He's going to compose a tune."

15b:

/ 'phǒm ˌmâj ˌsàʔ "baaj /

"I'm not well."

Weak stress.

The author agrees with Thawisomboon's assignment of the weak

stress in all cases. This is not surprising since the weakly stressed syllables are the easiest to spot due to their relatively short duration and certain changes in segmental and pitch features.

It seems that the basic difference between Thawisomboon's analysis and that of the author lies in the area of the full and the secondary stress. That is to say, his fully stressed syllables may have a full or a weak stress in the author's system, while his secondary stressed syllable may be either fully or weakly stressed. It seems therefore rather odd that two native speakers should have two almost completely different systems in their assignment of stress or accent. This difference may be explained by the fact that Thawisomboon and the author are using different criteria in analysing what is likely to be spoken in different styles. As mentioned before, Thawisomboon used utterances in "slow colloquial style." The author has not been able to listen to his recording of the utterances and therefore cannot judge how slow is his "slow colloquial style" in relation to the five styles given in Chapter I. The difference in the stress patterns of the same utterances seems to the author to be due to the fact that Thawisomboon and the author are using different criteria. Although Thawisomboon used his intuition in judging the degrees of stress, auditory and articulatory cues were the main criteria for his stress assignment. This is because the topic of this thesis is the rhythm which is an auditory notion. Thus, the duration of the syllables, especially when they are phrase final, is significant in his system. The author, on the other hand, uses primarily linguistic criteria , namely the contrasting function of stress or accent. When the contrastive function has been established, the author then went on to find if there were any phonetic correlates to the various degrees of accent. As for the last syllable in a phonological phrase, the degree of accent it bears is judged, not by its duration which has been lengthened because of its final position in the phrase, but by other phonetic correlates such as changes in segmental and and pitch features, as well as by the degree of accent it normally has in a non phrase final position. Thus, the author would have assigned a weak

stress (in Thawisomboon terminology) and not a secondary stress to / mǎj / in the utterance 8b:

8b: ˌdii "tcaj ˈmǎj "Are you pleased?"

because there are various changes which are associated with the weak stress, which have taken place in this syllable. First the pitch contour changes from the rising tone to a high level. Secondly, the syllable nucleus which is / aj / in the phonological representations is ([ɛ̌ːj]) in the phonetic representation. Moreover, / mǎj / may be long in its duration in this position; but its duration must be short in the non phrase final position:

/dii tcaj mǎj kʰáː/ "Are you pleased?" (polite).

Thus, the difference between Thawisomboon's system of stress assignment and that of the author seems to be due to the difference in the criteria which have been used. If the author had admitted that the lengthening in syllables before a pause is significant in stress assignment, and had accepted such extra linguistic criterion as emphatic context, she would have agreed with Thawisomboon's analysis of stress in the majority of cases. For, obviously, all syllables (in the author's terminology) with (Accent 1) when they are emphasized, or when they are extra long, due to their final position, would be Thawisomboon's fully stressed syllables. All non phrase final syllables with [Accent 1] would relatively be less stressed - hence become syllables with secondary stress; while all unaccented syllables which are phrase final also become syllables with secondary stress because of their duration. And since Thawisomboon recognized only three degrees of stress, all his non-phrase final weak stressed syllables retain their degree of stress.

2.2 J.A. Gillette's Prosodic Features of Bangkok Thai uses the phoneme theory as the underlying framework. She thus recognizes the segmental phonemes (vowels and consonants), the suprasegmental phonemes (length, tones and stress) and the juncture phoneme (normal transition, two types of internal closed junctures, two types of open junctures, and

two types of parenthetical junctures). Her stress is defined as [6]:

"Although stress is defined largely in terms of volume, or loudness, the length of the vocalic nucleus and total syllable length, if the final is a nasal or a semivowel, is also affected.....On the other hand, the varying degree of stress may also define the tone shapes."

Four phonemic degrees of stress have been postulated namely [7]:

/ " / "heavy stress" characterised by the greatest Volume

Examples:

(i) / Khun ᵒ\càʔ ˈtɔ̀ŋ ʔaw ˈpaj "mâak / ᵒlɛ́ɛw ˈkɔ̂ /

"You ought to take the lot and..."

(ii) wee laa ˈníi ˈduuan ˈmee "sǎa ˈjon / rúʔ ˈduu "rɔ́ɔn kha/

"Right now it is April - the hot season."

/ ˈ / "normal stress" characterised by medium volume.

Examples:

(iii) ˈsìi ˈ phan ˈ pɛ̀ɛt " rɔ́ɔj ˈrǐan/

"480 dollars"

(iv) ˈ t hâa khun ᵒ paj " khrûaŋ ˈbin /

"If you go by airplane."

/ / "light stress" characterised by lesser volume. It will be indicated by a space.

Examples:

(v) fǒn ˈ tòk " mâak naj ˈ d uuan nán /

"It rains a lot in that month."

(vi) ᵒkhâw " tcaj ᵒmǎj khá/ /

"Do you understand?"

/ o / "weak stress" characterised by the weakest degree of volume. It will be referred to as "syncopation" because it differs from other degrees of stress in its effect on morphemes. It is included here because it is usually a stress phenomenon. Syncopated syllables normally occur in close transition following more heavily stressed syllables. There are certain form classes which are

usually syncopated:

/tɕaʔ/ "will," /kɔɔ/ "then."

Most prepositions, final particles of address are syncopated - if no question particle is present - and question particle if a final address is present.

According to Gillette, the interaction of stress on syllable length gives a scale of 5 relative degrees of length[8], as shown in (6), Length (a) is the shortest and length (e) the longest. T stands for a stop consonant while S stands for a semivowel.

(6)

(a) Occurs in syncopated syllables. The distinction between V and VV is lost.

(b)	'V	VN	VS	'VT	VV			VVT
(c)	"V	'VN	'VS	"VT	'VV	VVN	VVS	'VVT
(d)		"VN			"VV	'VVN	'VVS	
(e)						"VVN	"VVS	"VVT

Like Thawisomboon, Gillette made no attempt to find if the four degrees of stress have any grammatical function and used her impression of volume as a criterion in judging her degree of stress. Gillette also has one disadvantage in not being a native speaker of Thai and this disadvantage is proved fatal in her analysis. For instance, the author notices that her "heavy stress" always falls on syllables which bear either a high tone (/ rɔ́ɔn/ in (i), /rɔ́ɔj/ in (iii)), a rising tone (/sǎa/ in (ii)), or a falling tone (/ mâak / in (i) and (v), /khrʉ̂ang/ in (iv)). In English or American English, the sentence intonation will rise or fall on the last stressed syllable in that sentence and makes this particular syllable the most heavily stressed in that sentence. This may have led Gillette to feel that stressed syllables with a rising tone or a falling tone are more heavily stressed than the rest of the syllables in utterances in Thai. For it seems that the basic difference between her "heavy stress" and "normal stress" is the fact that the former have either a high or a falling pitch contour while the latter have not. The two degrees of stress in question, according to the author's analysis which is supported by the contrastive functions of the

the lexical items, are in fact the same, with two exceptions, / thâa / and / paj / in (iv) are only weakly stressed in comparison with / bin / in the same utterance. Yet, Gillette assigns a normal stress to all of them.

More valuable information is found in her remarks on the characteristics of the weakly stressed or syncopated syllables which in fact are the easiest to perceive. These characteristics are: (7) [9]

(7)

(a) A very short syllable length. The distinction between V and VV disappears completely.

(b) Syllables with original vowel clusters lose the first member of the cluster. [10]

(c) In syllables with a final semivowel, the vowel and the semivowel may combine into an intermediate vowel or the semivowel may even be lost.

(d) Syllables with final stop may lose the stop. [11]

(e) In this type of syllable, only 6 vowels may appear:
/ i ɯ u / remain the same, while
/ ɛ a ɔ / rise to the corresponding mid-position / e ə o /

(f) Syllables with original high, rising or falling tones change their pitch into a relative high pitch which differs from the pitch of the lexical high tone.

As will be shown in Chapters VI, VII, and VIII, a great deal of the author's findings coincide with Gillette's remarks on the changes which take place in weakly stressed syllables.

2.3 The next work to be examined is R. Noss Thai Reference Grammar (1964) which is also another phonemic study of Thai. Noss postulates three degrees of stress: loud, normal and weak stress with two types of onset, sustained or diminishing, giving 6 stress contours. [12] These contours and their examples are reproduced in (8)

(8)

(a) loud diminishing contour: / paj / "Let's go."

(b) loud sustained contour: / khǎw paj r ɯ̌ ɯ / paj / tɛ̀ɛ ...
"Did he go? Yes.he went, but...."

(c) normal diminishing contour: / khǎw paj r ɯ̌ ɯɯ/ paj /
"Did he go? Yes he went."

(d) normal sustained contour: /paj kan / "Let's go."

(e) weak diminishing contour: / ʔɔ̀ɔ k paj / "(he) went out."

(f) weak sustained contour: / ʔɔ̀ɔ k paj / khráp /
"(he) went out, Sir."

As mentioned by Noss [13] whether the contour is sustained or diminishing is predictable from the position of the syllable whether it is non-phrase final or phrase final. One may say, therefore, that Noss recognises three degrees of stress: loud, normal and weak. However, in looking at his examples in (8), it seems that the difference between the loud stress and the normal stress is in fact the difference between emphatic stress and an ordinary stress, and emphatic stress usually depends on extra linguistic factors such as context. For this reason, it is felt that emphatic stress should be left out in the description of a grammar. Again, Noss's notion of stress is defined in auditory terms with no attempt at finding its grammatical function.

The last work to be mentioned is Whitaker's "Stylistic Tone Changing rules in Thai." [14] Whitaker's work, strictly speaking, does not deal with stress but deals rather with the change in pitch contours of the tones. One of the factors which cause these changes is in fact the lack of stress on certain lexical items. Since his work has only a partial bearing on the feature "stress" or what the author calls "accent", the author will examine his article under the appropriate heading which, in Chapter VIII, deals with the pitch contours of the tones on syllables which bear different degrees of Accent.

2.4 Conclusion

Since the author's main criticism of the works mentioned in section 2.0 is their authors failure to show that the various degrees of stress they have postulated have any grammatical function in Thai, the author in Part Two of this thesis has set out to investigate this contrastive role. Since the term "stress" has been associated so closely with loudness, the author has chosen a more abstract and hence general

term "accent" which has its physical manifestations in terms of either duration, intensity and certain changes in segment and pitch features or all of these in the phonetic respresentations. The author's intuition still plays a great part in determining the various degrees of accent and in choosing utterances which are felt to be contrastive, grammatically, by the various degrees of accent. This intuition is, however, checked with the performance by 40 other native speakers of Thai (see Chapter III) and only when it has been found that other native speakers also recognise the same patterns in their ability to identify each pattern with certain syntactic structure such and such a degree of accent postulated. One claim which is made by the author which differentiates her work from the other writers is that the various degrees of accent are predictable, given the surface structure of the utterance, by a series of phonological rules. The rules do not only assign the correct degree of accent to each syllable of the utterance, but also convert what is known in generative grammar as "the phonological representations" of the utterance into its corresponding phonetic realizations defined in articulatory terms. Auditory criteria like "loudness" have been discarded since they belong to performance theory and depend not on the speaker-hearer's competence of his language, but rather on extra-linguistic factors such as distance between the speaker and hearer, the attentiveness of the listener as well as, in the case when the language the linguist is analysing is not his own, on his linguistic background.

Footnotes II

1. Thawisomboon S. Syllable Junction in the Stress Groups in Spoken Thai, London U. M.A.'s thesis (1956) p.1

2. The author does not have access to the recordings of his utterance.

3. Thawisomboon, p.17

4. Thawisomboon, p.p. 19-20

5. See quotation on p.33

6. Gillette J.A. Prosodic Features of Bangkok Thai. Georgetown U. unpublished master's thesis. (1955) p.6

7. Gillette J.A. p.6

8. Gillette J.A. p.7

9. Gillette J.A. p.12

10. In fact, only one item has this feature: /sia/ "until"

11. Again, only one lexical item has this phenomenon: /kap/ "with"

12. Noss R. Thai Reference Grammar, p.21

13. Noss R. p.22

14. Whitaker H.A. "Stylistic Tone Changing Rules in Spoken Thai" Glossa 3.2 (1969) p.190-197

CHAPTER III

EXPERIMENTS ON THE SYNTACTIC FUNCTION OF ACCENT

3.0 In linguistics, it is desirable to have some criterion on the basis of which one can decide the status of linguistic constructs. Operational tests, therefore, are essential in linguistic theory. However, one has to recogise two types of operational tests, for there is a difference between tests which allow physical correlations such as those designed to challenge or support the definition of the distinctive features and tests which do not allow the physical correlations, such as syntactic tests which would determine the degree of grammaticalness. It is the first type of the operational tests that we are interested in here.

3.1 A Recognition Test

In an attempt to find if other native speakers are conscious of the contrastive role of accent in Thai grammar in the same way as the author, a recognition test was carried out. The test was designed to find if certain accentual patterns have any influence in determining the speaker-hearer's choice of the surface structures of the utterances. Thus, 35 pairs of utterances were chosen for the test. In each pair of utterances, the lexical items are identical in their phonological representations. Intuitively, the author feels that if one of the pair say utterance A, is spoken with the accentual pattern 2 1 or 3 1 on one lexical item, that lexical item would be recognised as a compound noun; whereas if the other utterance - utterance B - is spoken with the accentual patterns other than 2 1 or 3 1, it would be recognised as belonging to another surface structure.

The 35 pairs of utterances (70 in all) were mixed at random with the help of one of the charts of randomization.[1] They were then recorded on a tape which was played back to 40 subjects.[2] Each subject was given a questionnaire which contains in the left-hand column the

orthographic representation of the utterance with no indication of any accentual pattern. Corresponding to each utterance, paraphrases of the meanings of utterance A (with the accentual pattern 2 1 or 3 1 on one lexical item) and utterance B (with other accentual pattern on the same lexical item) are given on the right-hand column so that A is the paraphrase of the utterance A, and B is the paraphrase of the contrasting utterance B. The subjects were then asked to identify each utterance they heard as meaning A or B.

However, in certain utterances, such as utterances 7, 23, 28, one of the paired utterances may have another [Accent / Accent 1] present in the verb phrase. It was first thought that one should exclude these utterances; as this extra cue, and not the accentual pattern we are testing, may determine the listeners' judgement. But since the extra cue is also another degree of accent, which is precisely what we are testing, there seems to be no need for eliminating them from the test, for one may say that in these particular utterances there is more than one cue with regard to the accentual pattern. The texts of the utterances used in the test, with their accentual patterns and paraphrases are:

Utterances and their accented patterns							Paraphrases
1. /ˆluuk ˋbit ˋpraʔtuu thaan ˇkhwaa/							
A.	2	2	4	1	3	1	A. The handle of the door on the right.
B.	1	1	3	1	3	1	B. Child, turn the door (handle) on the right.
2. /ˊnaam ˋklan ˇdaaj ˊlɛɛw/							
A.	3	1	3		1		A. The distilled water is ready.
B.	1	1	3		1		B. Water, distil it now.
3./ˊnaam ˆtom ˆdaaj ˊlɛɛw/							
A.	3	1	3		1		A. The boiled water is ready.
B.	1	1	3		1		B. Water, boil it now.
4./ˊrak ˇsaa khon tɕon ˇhaaj/							
A.	3	1	3	1	1		A. (He) has cured a poor man.
B.	3	1	3	3	1		B. (He) has cured someone until he recovered.

Utterances and their accented patterns		Paraphrases
5. /^kaj ^baan ˊnan ˋkhaj ˋʔɔɔ ˋdok k/		
A. 3 1 1 1 1 1		A. Domesticated chickens are fertile.
B. 1 3 1 1 1 1		B. Chickens in that house are fertile.
6. /ˇkhaw ˋsaj ^suːa khlum ˇsuaj/		
A. 3 1 2 1 1		A. She wore a pretty coat
B. 3 1 1 1 1		B. She put on a coat and wrapped herself up beautifully.
7. /ˊnaa ˇkhaaw dii tcaŋ		
A. 3 1 1 3		A. Aunt Khaaw is very kind.
B. 1 1 3 3		B. Aunt has a very fair complexion.
8. / ʔaw ˊwaj ^naa ˊlɛɛŋ ˊna/		
A. 3 1 3 1 3		A. Leave it until the dry season.
B. 3 1 1 1 3		B. Leave it in front of L n.
9. / duaŋ ^naa ^maj dii/		
A. 3 1 3 1		A. His facial expression shows anxiety.
B. 1 1 3 1		B. Duaŋ, his facial expression shows anxiety.
10. /^phuu ˊraaj ^tɔɔŋ ˇkhaŋ ˊna/		
A. 4 2 4 1 3		A. He is a dangerous criminal
B. 3 1 4 1 3		B. He is a criminal, imprison him.
11. /ˇkhɔɔŋ ˇphom ˋjuu naj tuu/		
A. 3 3 3 3 1		A. Mine are in the cupboard.
B. 1 3 3 3 1		B. My belongings are in the cupboard
12. / klaaj pen maa mɯaŋ ^khuun naan ˊlɛɛw/		
A. 1 3 3 1 3 1 3		A. It became a colony some time ago.
B. 1 3 1 3 3 1 3		B. It became a country some time ago.
13. /ˇsam ˋrap rɔɔŋ ˊthaaw khrâj/		
A. 3 3 3 1 1		A. For whose shoes?
B. 3 3 1 1 1		B. For supporting whose feet?

14. /ˇkhaw ˋkep ˊwaj ˇlaŋ ^tuu/

A. 3 1 3 2 1 — A. He kept it on top of the cupboard.

B. 3 1 3 1 1 — B. He kept it behind the cupboard.

15. / plaa ˇlaj paj ˋmot ˊlɛɛw/

A. 3 1 3 1 3 — A. The eels are gone.

B. 1 1 3 1 3 — B. The fish have all escaped.

16. /ˊtchaaŋ phaŋ ^baan ˊniː/

A. 2 1 1 1 — A. The female elephant from this house

B. 1 1 1 1 — B. The elephant has destroyed this house.

17. /ˇkhaw ˋkhap ˊrot rew ˋsaʔˇmɣɣ/

A. 3 1 2 1 2 1 — A. He always drives a sportscar

B. 3 1 1 1 3 1 — B. He drives the car very fast, always.

18. / khon tcon ˋtcaʔ ^jɛɛ /

A. 3 1 3 1 — A. The poor will suffer.

B. 1 1 3 1 — B. I'm miserably poor.

19. /^ naa ˊrɔɔn ^maj mii lom/

A. 3 1 3 3 1 — A. There is no breeze in the hot season.

B. 1 1 3 3 1 — B. It is likely to be hot since there is no breeze.

20. /^mɛɛ khun ˇkhɔɔŋ ˇtchan/

A. 3 1 3 3 — A. My wife.

B. 1 3 3 3 — B. My husband's mother.

21. /ˇsam ˋrap baŋ taa ˊkhraj/

A. 3 3 3 1 1 — A. For whose door screen?

B. 3 3 1 1 1 — B. For blinding whose eyes?

22. /ˇkhɔɔŋ ˊkhaaŋ khuuuun ˊnaʔˊkha/

A. 2 2 2 1 3 3 — A. They are leftovers.

B. 1 2 1 1 3 3 — B. They were left overnight, so I've brought them back.

23. /ˊkhaw ^naa ˇm ɯan khraj/

A. 3 1 1 1 — A. Of whom does his face remind one?

B. 3 1 1 1 — B. Him, who does he look like?

24. /^luuk ˅laan ^kha /

A. 3 1 3 — A. They are all descerdants.

B. 1 1 3 — B. They are my sons. (The speaker is the listener's neice).

25. /˗rot tchon khon ˋtcep taaj/

A. 1 1 3 1 1 — A. The car ran over a sick man and killed him.

B. 1 1 1 1 1 — B. The car ran over people and several were injured.

26. / naaj ^naa ˋtca??aw/

A. 3 1 3 1 — A. The broker will have it.

B. 1 1 3 1 — B. You should have it.

27. /˅maa ^baan ˊnan ^tch uu aŋ/

A. 2 1 3 1 — A. Domesticated dogs are tame.

B. 1 3 1 1 — B. The dog in the house is tame.

28. /˅naŋ ˅s uuu phim ˋset ˅r uuu /
jaŋ

A. 4 2 1 1 3 3 — A. Have you finished with the newspaper.

B. 3 1 1 1 3 3 — B. Have you typed the paper?

29. /˅khaw tham ˋ?a? raj kan ^juu
^khaaŋ^baan/

A. 3 1 3 1 3 3 3 1 — A. What are the neighbours doing?

B. 3 1 3 1 3 3 1 1 — B. What are they doing beside the house?

30. /˅naam ˊkhaaŋ ^juu bon ^jaa/

A. 3 1 3 3 1 — A. The dew is still on the grass.

B. 1 3 3 3 1 — B. The water rests on the grass.

31. /^mɛɛ ^baan ˊnan ŋaan ˋnak/

A. 2 1 3 1 1 — A. Housewives have a lot to do.

B. 1 3 1 1 1 — B. The mother in the house has a lot to do.

32. / naa ˊli? kaa ˋpluk ˅tchan/

A. 4 4 2 1 3 — A. My alarm clock.

B. 3 3 1 1 3 — B. The clock woke me up.

33. /˥khaw˄ khaa khon taaj/

A.	3	1	3	1	A. He killed a dead man.
B.	3	1	1	1	B. He killed a man dead.

34. /˄luuk ˥naam tem ˘tum/

A.	3	1	1	1	A. The jug is full of lava.
B.	1	1	1	1	B. Son, the water in the jug is now full.

35. /˥hen taa˘ʔuut ˅maj/

A.	1	3	1	3	A. Have you seen Master Uut?
B.	1	1	1	3	B. Can you see the eyes of the camel?

3.2 The Informants

40 subjects volunteered to take the test. These subjects were Thai students studying in the United Kingdom. None of the subjects left Thailand before the age of 18. 30 were born and had lived in Bangkok and knew no dialect other than Standard Thai; the other 10 were born elsewhere in Thailand and are bilingual in their dialects and Standard Thai. However, in comparing the result of their test, there seems to be no need to separate the two types of subjects since the average results from both types are almost the same. The average number of unfavourable answers given by the Bangkok students was 10.2% while the average number of unfavourable answers given by the non-Bangkok students was 8.4%. The difference of 1.8% between the two average numbers may be due to the larger number of the Bangkok students.

3.3 The Result

The actual result of the test is presented in Table 3.1.

If it is assumed that the accentual pattern is irrelevant in determining the comprehension of each utterance, when presented, then it can safely be assumed that over a sufficiently large sample of utterances, the answers arrived at, to all intents and purposes, randomly, would produce an equal number of A paraphrases to an equal number of B paraphrases for each utterance (with accentual pattern A or accentual pattern B): i.e. a 50%- 50%chance. Therefore, the results of our test on 40 informants should be:

(con'd on p 52)

TABLE 3.1

RESULTS OF THE RECOGNITION TEST

Utterance played	Answers Received Paraphrase A	Paraphrase B	Utterance played	Answers Received Paraphrase B	Paraphrase A
1A	36	4	1B	39	1
2A	37	3	2B	31	9
3A	37	3	3B	37	3
4A	24	16	4B	34	6
5A	24	16	5B	35	5
6A	32	8	6B	35	5
7A	34	6	7B	38	2
8A	33	7	8B	37	3
9A	32	8	9B	35	5
10A	26	14	10B	34	6
11A	35	5	11B	25	15
12A	38	2	12B	40	0
13A	40	0	13B	38	2
14A	24	16	14B	20	20
15A	38	2	15B	39	1
16A	34	6	16B	38	2
17A	28	12	17B	32	8
18A	30	10	18B	33	7
19A	29	11	19B	21	19
20A	40	0	20B	37	3
21A	31	9	21B	33	7
22A	38	2	22B	36	4
23A	31	9	23B	23	17
24A	35	5	24B	36	4
25A	36	4	25B	27	13
26A	37	3	26B	37	3
27A	30	10	27B	37	3
28A	39	1	28B	39	1
29A	24	16	29B	31	9
30A	40	0	30B	40	0
31A	38	2	31B	38	2
32A	28	12	32B	38	2
33A	27	13	33B	36	4
34A	40	0	34B	40	0
35A	38	2	35B	37	3
35	1163	237	35	1196	204

One accentual pattern A should produce 20 A paraphrases and 20 B paraphrases,
One accentual pattern B should produce 20 B paraphrases and 20 A paraphrases.

The author has consulted a statistician[3] who agreed that a sample of 40 individuals should be sufficiently large enough to represent other native speakers of the Thai language. Now, our aim is to test whether the result of the test (given in Table 3.3. on p. 51) could have been arrived at randomly. The statistical test used for this purpose is called the χ^2 test.[4] χ^2 tests essentially whether the observed frequecies in a distribution differ significantly from the frequencies which might be expected according to some assumed hypothesis.

The Null hypothesis. If our hypothesis is wrong, that is, accentual patterns have no influence whatsoever on the 40 subjects' choice of answer, one would expect that each utterance would produce 20 Answers A and 20 Answer B, i.e. 20 is the expected frequency.

Corresponding to each frequency predicted by the Null hypothesis, there will be an observed frequency which is the result of each utterance in the test. The observed frequencies for each utterance A played are given in the second and the third columnsof Table 3.3 on p. 51. The observed frequencies for each utterance B played are given in the fifth and the sixth columns of the same table. If we denote the expected frequecy by E, and the observed frequency by O , then χ^2 is calculated as the sum of the terms like :

$$\frac{(O - E)^2}{E} \quad \text{or} \quad \chi^2 = \leq \frac{(O - E)^2}{E}$$

We then calculated the value of χ^2 for all the utterances A played, from figures in the second and the third columns of Table 3.3. with this result:

$$\chi^2 \text{ of utterances A} = 701.90$$

The calculation of the value of χ^2 for all the utterances B played from figures in the fifth and the sixth columns of Table 3.3. is :

$$\chi^2 \text{ of utterances B} = 826.00$$

The question now is whether the calculated values of χ^2 are sufficiently great enough to refute the Null hypothesis that the observed discrepency between the frequency of favourable answers and unfavourable answers to the author's hypothesis, could have arisen by chance. To answer this question, we have to decide the appropriate degree of freedom for which the table of χ^2 should be entered. In our case, the degree of freedom[6] is $(35 - 1) = 34$. Looking at the table[7] for the value of χ^2 with the degree of freedom = 34 , we find that

the 5% level of χ^2 (probably significant)	is	48.60
the 1% level of χ^2 (significant)	is	56.06
the .1% level of χ^2 (highly significant)	is	65.25

Since both our results exceed even the highly significant level, we should be on strong grounds in assuming that the results of the test could not have been arrived at randomly and that our original hypothesis is right. Accent does have a great influence on the subjects' choice, and we may conclude that it is quite certain that the subjects' comprehension of the utterance is determined by the different accentual patterns.

The test may be carried out on each individual utterance. In fact when this is done, it is found the value of χ^2 for each of the utterances below, fails to acheive even the 5%(probable significant) level which is 3.85 (. the degree of freedom = 1 in each case)

(8)

utterance	value of χ^2	utterance	value of χ^2
4A	1.6	11B	2.5
5A	1.6	14B	0.0
10A	3.6	19B	0.1
14A	1.6	23B	0.9
29A	1.6		

We will come back to look at these utterances later in the summary on p. 197- 199 to see if this failure is due to a flaw in the accent placement rules or to other factors which have stronger influence than accent, which had determined the subjects' choice.

Footnotes III

1. From Tracts for Computer XXIV, p. 17 , Cambridge University Press,(1939) edited by J. Pearson.

2. The tape is in the author's possession.

3. The author would like to express her thanks to Dr. Dasguptas of the Department of Economics and Statistics at the School of Oriental and African Studies, for his invaluable guidance in choosing the appropriate statistical test.

4. χ^2 test, see Moroney : Facts from Figures, p. 249-256

5. The Null hypothesis is so called because the calculated value of χ^2 would be zero if the values of the expected and the observed frequencies are equal.

6. The degree of freedom is determined by the predictability of the values of the frequencies. If other frequencies can be predicted when the value of one frequency is known, then the degree of freedom is one; if two frequencies must be given before all other frequencies may be predicted, then the degree of freedom is two. In our case, for each group of utterances A and utterances B played, we need to know the values of (35 - 1) frequencies before the values of all other frequencies may be predicted, the degree of freedom in our case, for group A utterances and for group B utterances, is therefore 34.

7. From Table IV of Statistical Tables for Biological Agricultural and Medical Research, (1963) p.47. edited by Fisher and Yates.

CHAPTER IV

ILLUSTRATIONS OF THE SYNTACTIC FUNCTION OF ACCENT

4.0 One of the functions of accent in colloquial Thai is its use for distinguishing utterances which may have the same lexical representation, but which belong to different syntactic structures. The utterances used in the recognition test in Chapter III are examples of this function of accent. The result of the same test showed that the subjects gave one syntactic analysis to a sentence spoken with one accentual pattern; but a different syntactic analysis to the "same" sentence spoken with a different accentual pattern, and were thus able to identify each utterance they heard with its corresponding paraphrase A or B. What is needed here is the illustration of the way in which the syntactic structure of utterance A differs from that of utterance B.

We have mentioned earlier that each utterance A in the test contains lexical items which form a compound noun. We now want to see the way in which the structure of the corresponding lexical items in utterance B differs from that of a compound noun. To do this, we group the utterances B into 8 groups according to their structures.

4.1 Group 1

In this group, each of utterances A contains a compound noun which consists of a noun followed by a transitive verb. The analysis of the compound nouns in this group is:

(1) $[_N \# [_N \# X \#]_N \quad [_{Vt} \# Y \#]_{Vt} \#]_N$ [1]

Examples:

(2A) /ˊnaam ˋklan / "distilled water" (inst. compound)[2]
water distil

(3A) /ˊnaam ˆtom / "boiled water"
water boil

(10A) /ˆphuu ˊraaj ˆtɔ̂ŋ ˇkhaŋ / [3] "captured criminal"
criminal must imprison

(25A) /ˇnaŋ ˇs ɯɯ phim / "newspaper"
book print

The corresponding utterances B in this group are all imperative sentences. Each sentence contains a transitive verb followed by a noun object. The subject of the sentence has been deleted by a subject deletion transformational rule (see Warothammasikkhadit T^{op} 7)[4] which may be described as:

(2) $[_S\ [_{NP}\ \#X\#]_{NP}\ [_{VP}\ [_{Vt}\ \#\ Y\#]_{Vt}\ [_{NP}\ [_N\ \#\ Z\#]_N]_{NP}\ AB\ ]_{VP}]_S$
$\Longrightarrow\ [_S\ [_{VP}\ [_{Vt}\ \#\ Y\#]_{Vt}\ [_{NP}\ [_N\ \#\ Z\#]_N]_{NP}\ AB\ ]_{VP}]_S$

(X, Y, Z, A and B are variables of lexical items in that particular class.)

The same sentence has also undergone the object inversion transformational rule, which had not been included among the rules given by Warothammasikkhadit.[5] This rule may be stated as:

(3) X Vt NP Y $\Longrightarrow$ NP X Vt Y

Apply this rule to the output of (2) we now have the surface structure:

(4) $[_S\ [_{VP}\ [_{Vt}\ \#\ Y\#]_{Vt}\ [_{NP}\ [_N\ \#\ Z\#]_N]_{NP}\ AB]_{VP}]_S \Longrightarrow$
$[_S\ [_{VP}\ [_{NP}\ [_N\ \#\ Z\#]_N]_{NP}\ [_{Vt}\ \#\ Y\#]_{Vt}\ AB]_{VP}]_S$

Examples:

(2B) /ˊnaam ˋklan / "Water, distil (it)"

(3B) /ˊnaam ^tom / "Water, boil (it)"

(10B) /^phuu ˊraaj ^tɔɔŋ ˇkhaŋ / "Criminal, imprison (him)"

(28B) /ˇnaŋ ˇs ɯɯ phim / "Book, print (it)"

4.2 Group 2

In this group, the compound nouns in utterances A have the structure:

(5) $[_N\ \#\ [_N\ \#X\#]_N\ [_{Vt}\ \#Y\#]_{Vt}\ [_N\ \#Z\#]_N\ \#]_N$

Examples:

(1A) /^luuk ˋbit ˋpraʔ tuu / "door handle
handle turn door

not in the text:

/ˊrot ˋbot ˋthaʔnon / "steam roller"
car press road

/ˋhun ^laj kaa / " a scarecrow"
figure chase crow

/ˋdek ʔom m ɯɯɯ/ "an infant"
child suck hand

/ˇs ɯa kin wua / "a game played on a chessboard"
tiger eat cows

/ kaa ˊlak ˊnaam / "syphoning"
crow steal water

The same lexical items in utterances B, on the other hand, form a whole sentence of a subject NP followed by a VP which is a transitive verb and an NP object:

(6) [S [NP [N X N] NP [VP [Vt Y Vt [NP [N Z N] NP] VP] S

Examples:

/^luuk ˋbit ˋpra? tuu / "child turned the door" (with luuk = 1) handle and 2) child, being homophones).

/ˊrot ˋbot ˋtha?ˇnon / "the car flattened the road (surface)

/ˋhun ^laj kaa / "the figure frightened the crows away"

/ˋdek ?om m ɯɯ/ "the child sucked (his) thumb"

/ˇs ɯa kin wua / "the tiger ate the cows"

/ kaa ˊlak ˊnamm/ "The crow has stolen the water"

Utterances 16A, 16B 32A and 32B also resemble these structures to some extent. Utterance 32A contains a compound noun which is followed by the possessive preposition / khɔɔŋ/ and an NP. The possessive preposition has been deleted by Warot's T^{opt} 9).[6] The underlying structure of utterance 32A is:

(7) [NP [NP [N [N naa ˊɬi? kaa N [Vt ˋpluk Vt]N] NP [Prep ˇkhɔɔŋ Prep [NP [Pron ˇtchan Pron] NP] NP]

Warot's possessive deletion rule states that:

(8) $(T^{opt}9)$ $X + Nom_1 + khɔɔŋ + Nom_2 + Y \Rightarrow X + Nom_1 + Nom_2 +$

Apply this rule to (7), we now have the surface structure:

(9) NP [NP [N [N naa ˊɬi? kaa]N [Vt ˋpluk]Vt]N] NP [NP [Pron ˇtchan]Pron] N] N
"My alarm clock"

But the same lexical items in 32B have a different structure:

(10)
[S [NP [N naa ˊɬi? kaa]N] NP [VP [Vt ˋpluk]Vt [NP [Pron ˇtchan]Pron] NP] VP] S
"The clock woke me"

The structure of utterance 16B resembles the structure of the B utterance described above, but the structure of utterance 16A differes from

(7) in three respects. First, / phaŋ / "female" (for elephant) in 16A and / phaŋ / "to destroy" in 16B are homophones and not the same lexical item. Secondly, / phaŋ / in 16A is an intransitive verb while / phaŋ / in 16B is a transitive verb, and thirdly, the second NP in both utterances is a noun and not a pronoun as in (7). The structural analyses of the two utterances may be described as follows:

(11)
16A: [NP [NP [N [N tchaaŋ]N [Vi phaŋ]Vi]N] NP [NP [N baan]N
"elephant" "female" "house"
[det nii]det] NP] NP
"this"

"The female elephant from this house"

(12)
16B: [S [NP [N tchaaŋ]N] NP [VP [Vt phaŋ]Vt [NP [N baan]N
"elephant" "destroy" "house"
[det nii]det] NP] VP] S
"this"

"The elephant has destroyed this house"

4.3 Group 3

In this group, the compound nouns in utterances A have the structure:

(13) [N [N X]N [Vi Y]Vi]N

Examples:

(7A) / naa khaaw / "Aunt Khaaw" (khaaw, a name, is homophonous with khaaw = white)
"aunt" "Khaaw"

(15A) / plaa laj / "A kind of fresh water fish"
"fish" "flow"

(18A) / khon tcon / "The poor"
"man" "poor"

(29A) / khɔ̌ŋ khaaŋ khɯɯn / "Leftovers"
"thing" "overnight"

(30A) / naam khaaŋ / "dews"
"water" "rest"

The corresponding lexical items in utterances B, however, have the structure described in (14):

(14) 7B: [S [NP [N naa]N] NP [VP [Vt khaaw]Vt Yz]VP] S
"aunt" "white"

"(my) aunt has a fair complexion (i.e. white)"

Other examples:

(15B) / plaa ˇlaj / "The fish has flown away"

(18B) / khon tchon/ "I am poor"

(22b) / khɔɔŋ ˊkhaaŋ / "The stuff is left overnight"

(30B) /ˊnaam ˊkhaaŋ / "The water is resting (on the grass)"

Utterances 7A, 7B and 26A, 26B partially resemble structures of utterance A and utterance B in this group. In 7A, 7B, the paired utterance is possible because /ˇkhaaw /, a proper name and /ˇkhaaw / "to be white" are homophones, while in 26A, 26B /^naa / "front" in utterance A is homophonous with /^naa / "should" in utterance B. Their analysis is as follows:

(15)

(26A) [N # [N # naaj #] N [N # ^naa #] N #] N "A middle man"
"man" "front"

(7A) [N # [N # ˊnaa #] N [N # ˇkhaaw #] N #] N "Aunt Khaaw"

(26B) [S [NP [pron # naaj #] pron] NP [VP [Vi # ^naa #] Vi X Y] VP] S
"You should....."

(7B) [S [NP [N # ˊnaa #] N] NP [VP [Vi # ˇkhaaw #] vi X Y] VP] S
"(My) aunt is fair (in complextion) (lit. "white") "

Examples of compound verbs which may also have paired utterances with the structure of the type B are also found:

(16) A: [N # [N # ^paak # N [vi # ˇwaan #] vi #] N "To be flattering"

B: [S [NP [N # ^paak #] N] NP [VP [Vi # ˇwaan #] Vi] VP] S "Your mouth is sweet"
(You have a sweet tooth)

A: [N # [N # ˇlaŋ #] N [Vi # jaaw #] Vi #] N "To be extremely lazy"

B: [S [NP [N # ˇlaŋ #] N] NP [VP [Vi # jaaw #] Vi] VP] S "Your back is long"

4.4 Group 4

The compound nouns in utterances A of this group have the same structure as those in Group 1.

(17) [N # [N # X #] N [Vi # Y #] Vi #] N

But they function differently in a sentence in which each of them is an NP object to a transitive verb:

Examples:

(25A) /ˊrot tchon khon ˋtɕep / "A car knocked down the patient"

(23A) /ˇkhaw ^khaa khon taaj / "He killed a dead man"

(17A) /ˇ khaw ˋkhap ˊrot rew saˇmɯɣ /"He always drives a sportscar"

In the contrasting utterances B, there are two structures one has to recognise. In both cases, the lexical items which constitute a compound noun in utterance A occur after an NP subject which is followed by a transitive verb. In one case the lexical item which is a noun functions as the object NP to this transitive verb, while the second item which is an adverb modified the verb phrase. This is the case of 17B which may be analysed as:

(18)
(17B): [NP # ˇkhaw #] NP [VP [Vt # ˋkhap #] Vt [NP [N # ˊrot #] N] NP
[adv # rew #] adv] VP

In the second structure, one has to recognise the use of "completive verbs" in a sentence which has undergone a transformational rule which deletes an NP and a conjunction in certain structures. This rule may be stated as:

(19)

NP_1 + Vt + NP_2 + Conj + NP_2 + Vi ⟹

/ˇkhaw ^khaa khon tcon khon taaj/
he kill a man until the man die

NP_1 + Vt + NP_2 + Vi

/ˇkhaw ^khaa khon taaj /

Utterance 25B has this structure. (19) is in fact the operation of two transormational rules, one deletes the second NP_2 while the other deletes the conjunction. The first rule is obligatory while the second rule is optional. Utterance 4B is an example of a sentence in which only the first transformational rule applies:

(4B) /ˊrak ˇsaa khon tcon ˇhaaj / "(He) treated the man until he
treat a man until recover recovered"

4.5 Group 5

In this group, the compound noun in each of utterance A has the structure:

(20) [N # [N # X # N [N # Y #] N #] N

Examples:

(5A) /ˋkaj ^baan / "domestic chicken" (as opposed to /ˋkaj ˋpaa/ "pheasant")
chicken house

(27A) /ˇmaa ^baan / "domestic dog" (as opposed to /ˇmaa ˋpaa / "wolf")

(9A) / duaŋ ^naa / "facial expression"
round face

(11A) /ˇkhɔɔŋ ˇphom / "mine"
thing I

(20A) /^mɛɛ khun / an affectionate term used by a husband to address his wife
mother you

(24A) /^luuk ˇlaan / "descendants"
children, grandchildren, neice, nephew

(31A) /^mɛɛ ^baan "a housewife"
mother house

(35A) / taa ˋʔuut / "Master Utt"
master name

(23A) /ˊkhaw naa / "facial outline"
outline face

While the corresponding lexical items in utterances B have the structure:

(21)
[NP [NP [N + X +]N] NP [Prep + Y +]Prep [NP [N + Z +]N] NP] NP

which has undergone a preposition deletion transformational rule.

Examples:

(5B) /ˋkaj ( ) ^baan / "chickens in this house"

(9B) / duaŋ ( ) ^naa / "Duang's face" (After the operation of the noun inversion transformational rule)
See Warot (T^{opt}_{17})[7]

(11B) /ˇkhɔɔŋ ( ) ˇphom / "my belongings"

(20B) /^mɛɛ ( ) khun / "your mother"

(24B) /^luuk ( ) ˇlaan / "The neice's or newphew's children"

(31B) / taa ( ) ˋʔuut / "The eyes of a camel" (taa = a term of address for a young boy is homophonous with taa = "eye")

4.6 Group 6

The compound nouns in utterances A in this group have the same structure as those in group 5.

(22) [N + [N + X +]N [N + Y +]N +]N

but the first noun belongs to one subclass of the noun class , namely the placewords.

Examples:

(14A) /ˇlan ^tuu / "The top of the cupboard"
back cupboard

(29A) /^khaaŋ ^baan / "The neighbour"

The corresponding lexical items in utterances B, on the other hand, form a locative phrase (loc. P) which consists of a placeword followed by an NP, which in this case is a noun:

(23) [Loc. P [N # X #]N [N # Y #]N]Loc. P

Examples:

(29B) /^khaaŋ ^baan / "Beside the house"

(14B) /ˇlan tuu / "Behind the cupboard"

If one admits homophones, utterances 8AB also belong to this group:

(24) (8A) [N#[N #^naa#]N [Vi #´lɛɛ ŋ#Viˇ#]N "Thedry season"
season dry

(8B) [Loc. P [N#^naa#]N [N#´lɛɛ ŋ#]N] Loc. P "In front of Lang"
front Lang

Other examples not in the text are:

	A	B
/ klaaŋ wan / middle day	"day"	"in the middle of the day"
/ klaaŋ khɯɯn / middle might	"night"	"in the middle of the night"
/ˇn ɯaˇhua /	term for addressing the king	"Above one's head"

4.7 Group 7

The compound nouns in this group consists of a noun followed by one of the following verbs of motion, which is a subclass of intransitive verbs:

/^khɯn /	"go up"
/ loŋ /	"go down"
/^khaw /	"go in"
/ˋʔɔɔk /	"go out"

Their structure may be described as:

(25) [N # [N # X #]N [Vi # Y #]Vi #] N

Examples:

(8A) / m ɯaŋ ^khuun / "a colony"
country go up

not in the text:

/ thaaŋ ˋʔɔɔk / "a way out, a solution"
way go out

/ ^khaaŋ ^ kh uun / "waxing moons"
side go up

/ ˈnaam loŋ / "ebbing tide"
water go down

The four verbs of motion are accented, or bearing (Accent 1). If one substitutes (Accent 1) by (Accent 3) this would change the syntactic class of the items in question from a verb to a verb modifier (VM). Apart from having a different degree of accent from that of a verb, verb modifiers function as modifiers to another verb of motion, denoting the direction of the motion.

Examples:

/ piin ^khaw / "to climb in"
climb in

/ dɣɣn ˋʔɔɔk / "to walk out"
walk out

/ ^ʔum ^kh uun / "to lift up"
lift up

/ dɣɣn loŋ / "to walk down"
walk down

The VM /^khuun / also has another figurative meaning. In this figurative use, /^kh uun / usually modifies a verb which means "becoming, coming into existence" with the additional meaning that such action took place for the first time.

(26)

Example:

(8B) [VP [Vi # klaaj #] Vi [Vi # pen #] Vi [NP [N # muraŋ] N] NP [VM # ^khuun] VM] VP
become to be country for the first time

"Became a country for the first time"

other examples of verbs like / klaaj pen / are:

ˋ kɤɤt ^kh uun "happen for the first time"

mii ^ kh uun "First come into existence"

ˇ haaj ^kh uun "To be lost for the first time"

4.8 Group 8

Compound nouns in utterances A of this group may be analysed as:

(27)

[N # [Vt # X #] Vt [N # Y #] N #] N

Examples:

(13A) / rɔɔŋ ˊthaaw / "shoes"
to support feet

(21A) / baŋ taa / "A door screen"
to cover eyes

not in the test:

/ˆsɔɔŋ ˋklin / "a white lily"
to hide fragrance

/ˋdaat ˊfaa / "roof garden"
to decorate sky

/ tii thɔɔŋ / "a kind of bird"
to beat gold

/ ʔɔɔ m ˇsin / "saving"
to save money

The corresponding lexical items in utterances B, on the other hand, form a verb phrase which contains a transitive verb followed by an NP which is a noun:

(28) (13B):

[VP [Vt # rɔɔŋ #]Vt [NP [N # ´thaaw #]N [prep # ( ) #]prep
to support feet

[NP [pron # khraj #]pron] NP] NP] VP

"to support whose feet?"

(29) (21B)

[VP [Vt # baŋ #]Vt [NP [N # taa #]N]NP [prep # ( ) #]prep [NP [Pron # khraj #]
to cover eyes who

Pron]NP] NP] VP

"to blind whose eyes?"

What have been described so far are only some illustrations of the way in which different accentual patterns determine the structures of utterances which have the same lexical representations. The contrastive use of accent has a much wider application in the language than the illustrations here show. Compound verbs too are contrasted with utterances with other structures by their accentual patterns as shown in (16) on p.59. Many lexical formatives belong to one syntactic class when they are accented and to another when unaccented, for example:

(30)

Accent 1		Accent 3	
[N # ˇkhɔ ŋ #]N	"thing, belonging"	[Prep # khɔ ŋ #]Prep	"of"
[Vt # ˋsak #]Vt	"to tattoo"	[PreNu # sak #]PreNu	"just (how much)"
[N # ˇkhaw #]N	"a hill"	[Pron # ˇkhaw #]Pron	"he, she"
[Vi # tciŋ #] Vi	"to be true"	[VM # tciŋ #]VM	"quite"

Footnotes IV

1. Only the structures of compounds which consist of two components will be given in this chapter. However, some of examples given are compounds with three components (e.g. (10A). For their analyses, see Chapter V, p. 73-80.

2. For "institutionalized compounds", see p. 78-80.

3. /^phuu ´raaj ^tɔɔŋ ˇkhaŋ / "captured criminal" may be analysed as :
[N# [N# [Conj# ^phuu#]Conj [Vi# ´raaj #]Vi #]N [PreV# ^tɔɔ ŋ#]PreV [Vt# ˇkhaŋ#]Vt#]N

4. Warɸhammasikkhadit : Thai Syntax, An outline, p. 54.

5. Warothammasikkhadit : op.cit. p. 57-60.

6. Warothammasikkhadit, op.cit. p. 54.

7. Warothammasikkhadit, op.cit. p. 57.

CHAPTER V

ACCENT PLACEMENT RULES

5.0 In Chapter IV, we have seen how two utterances with the same phonological representations may differ in their structures if one assigns different accentual patterns to them. Literature on accent or "stress" in the Thai language, the author's intuition supported by linguistic evidence, and the recognition test carried out on other native speakers - as reported in Chapter III of this thesis, all suggest that one may predict the accentual patterns of utterances in colloquial Thai by phonological rules which are formulated on the basis of a principle referred to by Chomsky and Halle[1] as the "transformational cycle." This principle operates on the basis that the surface structure is taken as a labelled bracketing and that the phonological rules first apply to the minimal strings which contain no brackets, and that after all the relevant rules have been applied, the innermost brackets are erased; the rules are then reapplied to the minimal strings containing no brackets, and again the innermost brackets are erased after this application; and so on until all the brackets in the utterances have been erased.

It seems that the description of word accentual patterns is sufficient for the description of the accentual patterns of all the utterances in colloquial Thai although Thawisomboon implies that one should also recognize (phonological) phrase accent (see p.37). We will, however, come back to discuss this under 5.6 on p. 86 , and will concern ourselves for the time being with Word Accent Placement Rules.

One may classify words in Thai, on the basis of their morpheme structures, into three types: (1) simple words or words which are monomorphemic, (2)compound words which are non-monomorphemic and (3) reduplicated words which are either simple words or compound words which have undergone the process known as reduplication. The definition of these three types of words are taken here to be self-evident.

5.1 Simple Word Accent Placement Rules

There are two types of simple words in Thai: monosyllabic

words and non-monosyllabic words. A monosyllabic word is any sequence of segments within the word boundaries which contain only one segment with the feature [+ syllabic] . A non-monosyllabic word is any sequence of segments within the word boundaries which contain more than one segment with the feature [+ syllabic] . The structure of a monosyllabic word and a non-monosyllabic word are described in (2) .

(1)

T = Tone
l = /l/ or /r/
G_1 = non-syl. V
G_2 = /j/,/w/

(2)

$$\# \left(C_1 \left(\begin{Bmatrix} l \\ w \end{Bmatrix} \right) V \ (G) \left(\begin{Bmatrix} G_2 \\ C_2 \end{Bmatrix} \right) \right)^{T} * \ C_1 \left(\begin{Bmatrix} l \\ w \end{Bmatrix} \right) V \ (G) \left(\begin{Bmatrix} G_2 \\ C_2 \end{Bmatrix} \right)^{T} \#$$

Examples:

(3)

Monosyllabic words:

/ˆmɛɛ /	"mother"
/ˋkaj /	"a hen"
/ˊnaam /	"water"

Non-monosyllabic words:

/ˊnaŋˇs ɯɯ/	"a book"
/ naaˊlikaa /	"a clock"
/ˊmiʔ ˋthulˊ naa jon /	"June"

The star notation in (2) indicates that the sequence may be repeated indefinitely but in fact 5 seems to be the maximum number of syllables a word may have in Thai[2] :

(4) / ˊphruu tˋsalˋtciʔ kaa jon / "November"

/ ˋpralˊ tchaa ˊthip ˋpalˊ taj / "democracy"

As mentioned before, one may predict the accentual pattern of an utterance through the operation of an ordered set of phonological rules on its surface structure, where the surface structure is a labelled bracketing of a string of formatives. The process of bracketing is in fact the syntactic analysis of the utterance while the labelling is done by using the

syntactic features as given in lexicon on the one hand, and by assigning the syntactic structure to the lexical formatives in the utterance in question on the other. The syntactic features in this case, are the categories to which each lexical formative belongs. Each lexical formative is entered in the lexicon under the phonological heading, as a string of segments and the tone (in terms of distinctive features as shown in Table 1.1 and Table 8.). The information we need to know before the operation of the rules which would assign a certain degree of accent to each string of formatives in the utterance is as follows:

(5)

(i) The number of segments with the feature [+ syllabic] within the word boundaries. (This information is given by the phonological representations of each formative).

(ii) The syntactic category of each string of formatives (given by the lexicon under the syntactic feature heading).

(iii) The syntactic relation between the strings of formatives in the utterance (given by the surface structure).

For our present purposes, we may recognise two subsets of the syntactic categories, namely the major and the minor sets. The major set consists of the following categories:

(6)

(i) Nouns (N) (including place words)

Examples:

/ˊnaam ˋklanˇ daaj ˊlɛɛw / "Water, distil (it) now

/ ʔaw ˊwajˆ naa lɛɛŋ́ ˊnaʔ / "Put it in front of Lang"

(ii) Verbs (V)

Exambles:

/ˊnaamˋklanˇ daaj ˊlɛɛw / "Water, distil (it) now"

(iii) Adjectives (Adj) (including numeral and post numeral)

Examples:

/ˋdek khonˆ rɛɛk / "The first boy"

/ piiˆ kwaa ˊlɛɛw / "More than a year ago"

(iv) Adverbs (Adv)

Example:

/ˇkhaw ˋ khap ˊrot rew ˋsaʔˇmɣ̀/ "He always drives fast."

(v) Demonstrative words (Det), when not functioning anaphorically.

Example:

/^mɛɛ ^baan ´nan ɲaan `nak / "The mother in that house works hard."

(vi) Interrogative words (Interro.)

Example:

/ paj ´naj kan / "Where are you all going?"

The minor set consists of all other categories not mentioned in (6), but for completeness, its members will be listed here:

(7)

(i) Personal Pronouns (P. Pron)

Example:

/ naa´ ʔi? kaa `pluk ˇtchan / "My alarm clock" lit. "alarm clock of me"

(ii) Reciprocal pronoun (only one member / kan /)

Example:

/ˇkhaw tii kan ^kha? / "They are fighting with each other"

(iii) Demonstrative pronouns, when used anaphorically

Example:

/^mɛɛ^ baan ´nan ɲaan `nak / "To be a housewife, that means a lot of work"

(iv) Classifiers (cl)

Example:

/^m ɛɛ ^baan ´nan ɲaan `nak / "The mother in that house works hard"

(v) Prenumeral (PreNu)

Example:

/^tanɲ ˇsaam ˇloo / "As many as three dozen"

(vi) Preverbs (PreV)

Example:

/ khon tɕon `tɕa? ^jɛɛ / "The poor will suffer"

(vii) Post-verb (PostV)

Example:

/`kep ´waj ˇlanɲ tuu / "Keep it (for future use) on the top of the cupboard"

(viii) Verb modifiers (VM)

Example:

/ˆkɤɤt pen muaŋ ˆkhuun maa / "Became a town (for the first time)."

(ix) Prepositions (Prep)

Example:

//ˊnaam ˊkhaaŋ ˋjuu bon ˆjaa / "The dews are on the grass"

(x) Conjunctions

Example:

//ˊrakˇsaa khon tconˇhaaj / "(He) treated people until they were better"

(xi) Negator:

Example:

//ˊkhaw ˆnaaaˆmaj dii / "He does not look pleased"

(xii) Sentence particles

Example:

/ˇkhɔɔŋ ˊkhaaŋ kh ɯɯnˊnaʔˊkhaʔ / "They are leftovers" [3]

/ˇhen taa ˋʔuut*ˇmaj / "Have you seen Master Utt?" [3]

The categories here are based mainly on Chanthavibul's list of word classes[4] with one exception: the verb modifier. What the author calls "verb modifiers" were listed under Chanthavibul's class of adverb[5]. The author has found it necessary to distinguish the two classes since all adverbs are accented while all verb modifiers are unaccented.

Examples:

Adverb: /ˇkhaw ˋkhapˊrot rew ˋsaʔˇmɤɤ / "He always drives fast"

VM: / khun maa ˆduajˇrɯɯ/ "You came as well?"

Accent placement rules for the simple word may be described as follows:

The non final syllabic segments receive [Accent 2] ; the final syllabic segment receives [Accent 1] if the word is one of the major set categories, and [Accent 3] if the word is one of the minor set categories. After all these accent placements, all non final syllabic segments have their accent reduced by one degree and then the word boundaries are erased. This statement may be formalized into two rules and a convention:

(8) $V \longrightarrow [\text{Accent } 2] \; / * C_1\left(\left\{\begin{matrix}\text{L}\\ \text{W}\end{matrix}\right\}\right) \bar{V} \; (G) \left(\left\{\begin{matrix}G\\ C_2\end{matrix}\right\}\right) \; \left(C_1\left(\left\{\begin{matrix}\text{L}\\ \text{W}\end{matrix}\right\}\right) V \; (G) \left(\left\{\begin{matrix}G\\ C_2\end{matrix}\right\}\right)\right) \#$

(V = syllabic nucleus, G_1 = nonsyllabic V, G_2 = /j/,/w/)

(9) $V \longrightarrow$

(a) [Accent 1] / # X Y Z $\bar{V}$ (C) #$_{\text{major set}}$

(b) [Accent 3] / # X Y Z $\bar{V}$ (C) #$_{\text{minor set}}$

(10) Convention

$$[\text{Accent } n] \rightarrow [\text{Accent } n+1] \; /\# C_1\left(\left\{\begin{matrix}\text{L}\\ \text{W}\end{matrix}\right\}\right)\bar{V} \; (G)\left(\left\{\begin{matrix}G\\ C_2\end{matrix}\right\}\right) \; \left(C_1\left(\left\{\begin{matrix}\text{L}\\ \text{W}\end{matrix}\right\}\right) V \; (G)\left(\left\{\begin{matrix}G\\ C_2\end{matrix}\right\}\right)\right) \#$$

Rule (8) applies only to non-monosyllabic simple words. Convention in (10) applies only at the word boundaries. Here are some illustrations of the operation of (8), (9) and (10).

(11)

[Vt # ˋpluk #] V t "to wake"
((8) not applicable)
1 ((9a))
(Convention (10) not applicable)
1

(12) [Post V # ^daaj #] PostV "can"
((8) not applicable)
3 ((9b))
(Convention (10) not applicable)
3

(13) [N # ˇnaŋ ˇs uuu #]N "a book"
2 ((8))
1 ((9a))
3 (Convention (10))
3 1

(14) [PreV # kam laŋ #] PreV "continuous aspect"
2 (8)
3 ((9b))
3 (convention (10))
3 3

(15)

[N #	naa	ʻtɕiʔ	kaa #] N	"a clock"
	2	2		((8))
			1	((9a))
	3	3		(Convention (10))
	3	3	1	

5.2 Compound Word Accent Placement Rules

Consider the accentual pattern of the following compounds.[6]

(16) /ˋkaj ˆbaan/

/m ɯaŋ ˆkh ɯn/

/ʻtɕhaaŋ phaŋ/

/ʻrot rew/

/ˇ naŋ ˇs ɯɯ phim/

/ naa ʻtɕiʔ kaaˋpluk/

Each compound in (16) consists of two components. By the definition of a compound, each component must have the status of a word and must be entered within the word boundaries while the whole compound also has a word status and must also be entered within another pair of word boundaries. All the items in (16) are compound nouns and thus belong to the major set of the categories. If one does not take into account the last two items in (16) in which one of the components is non monosyllabic, one may describe the accentual pattern of compounds in (16) as 2 1. Judging from this accentual pattern, one can see that if one were to formulate a compound Accent Placement Rule, such a rule will repeat the operation of (9a) in so far as [Accent 1] is assigned to the last syllabic vowel of a word (as compounds are entered within the word boundaries). The same rule would have to repeat the operation of the Convention (10) as well as (9a) since there is also an accent reduction in the non final syllabic vowel. The repetition of (9b) and the Convention (10) also occurs in the compounds which belong to the minor set of the categories as shown in (17).

(17)

/ˆ nɔɔk	ˋtcaak/		"besides"
outside	from		

/ˇr ɯɯ^waa/ or that	"or"
/ˊphrɔʔ ^waa/ because that	"because"
/ˊlɛɛw ^kɔɔ/ perfect aspect, then	"and, then"
/phrɔʔ ˋtchaʔ ˊnan/ because therefore	"therefore"
/^thaa ˋhaak ^waa/ if if not that	"if...not
/ˇsom ˊmut ^waa/ suppose that	"supposing that..."

All the final syllabic vowels in compounds in (17) receive [Accent 3] . Again, if one were to formulate a rule for these compounds, some part of the rule will resemble (9b) and (10). Observations from (16) and (17) suggest that one may be able to incorporate the compound Accent Placement rules with (9). There is, moreover, further evidence to support this incorporation. It has been observed that if a word which normally receives Accent n by (9a) or (9b) occurs as the non final component of a compound, its degree of accent will be [Accent n + 1] . That is to say, words from the major set which should have [Accent 1] by (9a) will have [Accent 2] and words from the minor set which should have [Accent 3] by (9b) and (10) will have [Accent 4] [7] when any of them occurs as a non final component of a compound. Thus, the compound /^nɔɔk ˋtcaak / in (17) has the pattern 2 3 since /^nɔɔk / which is a place word belongs to the major set; while /ˇr ɯɯ ^waa / has the pattern 4 3 as /ˇr ɯɯ / belongs to the minor set. This accent reduction is also found in the non final syllabic vowel of any component of the compound; thus /ˇnaŋˇs ɯɯ / which has the pattern 3 1 by (8) and (9a) has the pattern 4 2 in the compound /ˇnaŋˇs ɯɯ phim / in which it occurs as a non final component. In fact, this accent reduction in the compounds is identical with the accent reduction by the application of the Convention (10) which operates at the word boundaries. When one looks at the surface structure of a compound which also has the status of a word, one finds that each compound has an extra word boundary.

(18)

$$[_N\ \#\ [_N\ \#\ {}^{\check{}}\text{nan}{}^{\check{}}\text{s ɯɯ}\ \#]_N\ \ [_V\ \#\ \text{phim}\ \#]_V\ \#]\ \ N$$

(19)

$$\left[_{\text{Conj}} \# \left[_{\text{Conj}} \# \text{phrɔ̀l} \right]_{\text{Conj}} \left[_{\text{Conj}} \# \text{tchaʔ} \ \text{nán} \# \right]_{\text{Conj}} \right]_{\text{Conj}}$$

In fact, the accentual pattern of a compound may be assigned by the operation of the second cycle of (9a) or (9b) as the case may be, and the Convention (10); the instruction for this operation is already given in the surface structure by the extra word boundary. There is, therefore, no need to formulate a separate rule for the assignment of accent in compounds. (20), (21) show how accentual patterns of compounds may be arrived at.

(20a) $\left[_{N} \# \left[_{N} \# \text{khon} \# \right]_{N} \left[_{V} \# \text{tcon} \# \right]_{V} \right]_{N} \#$

1		1	(9a) first cycle
			(Convention (10) not applicable)
		1	(9a) second cycle
2			(Convention (10), second cycle)
2		1	

(20b) $\left[_{N} \# \left[_{N} \# \text{ˇnaŋ ˇs ɯɯ} \# \right]_{N} \left[_{V} \# \text{phim} \# \right]_{V} \# \right]_{N}$

2			(8)
	1	1	(9a) first cycle
3			(Convention (10), first cycle)
		1	(9a) second cycle
4	2	1	(Convention (10), second cycle)
4	2	1	

(21a) $\left[_{\text{Conj.}} \# \left[_{N} \# \text{ˆ n ɔɔ k} \# \right]_{N} \left[_{\text{prep}} \# \text{ˋ tcaak} \# \right]_{\text{prep}} \# \right]_{\text{Conj}}$

	1		(9a) first cycle
		3	(9b) first cycle
		3	(9b) second cycle
	2		(Convention (10) first cycle)
	2	3	

(21b) [# [# ˊphrɔ:ʔ #] [# ˋtchaʔ ˊnan #] #]
Conj Conj Conj Conj Conj Conj

	2		(8) first cycle
3		3	(9b) first cycle
	3		(Convention (10) 1st cyc
		3	(9b) second cycle
4	4		(Convention (10) 2nd cyc
4	4	3	

Let us now consider the following compounds:

(22)

(a) /^khr uaŋ ˊsak ^phaa / "a washing machine"
machine wash clothes

/^phaa ˊtchɑt tua / "a bath towel"
clothes wipe body

/ˋtcak ˊjep ^phaa / "a sewing machine"
machine sew clothes

/ prɛɛŋ ˇsii fan / "a toothbrush"
brush rub tooth

//toʔ ˇkhian ˇnaŋ ˇs uuu/ "a desk"

/^khr uaŋ ˋduut ˋfun / "a vacuum cleaner"
machine suck dust

(b) /ˇkhɔɔŋ ˊkhaaŋ kh uuun / "the leftovers"
thing over night

/^luuk ˋbit ˋpraʔtuu / "a door handle"
round turn door

/ˊnaam taaa thian / "tears (off the candle)"
water eyes candle

/^luuk ˊraʔ ˋbɣɣt m uuuu/ "a hand grenade"
round object explode hand

/ dɣɣn thaaŋ klaj / "to take a long trip"
walk way far

Each of these compounds consists of three components, each of which has a word status. Yet the accentual pattern of compounds in (22a) is: 2 3 1; while that of the compounds in (23b) is: 3 2 1. How is one to account for these two different patterns? Corresponding to each of the compounds in (22a) we have a compound verb:

(23)
(a) /ˊsak ^phaa / "to do some washing"

//tchet tua / "to dry oneself"

//jep ^phaa / "to do some sewing "

/ˇsii fan / "to clean one's teeth"

/ˇkhian ˇnaŋ ˇs ɯɯɯ/ "to do some writing"

/ˋduut ˋfun / "to hoover"

While corresponding to each compound in (22b) we have either a compound noun or a compound verb:

(23)
(b) /ˇkhɔɔŋ ˊkhaaŋ / "the leftovers"

/^luuk ˋbit / "a handle"

/ˊmaaj ˋkwaat / "a broom"

//naam taa / "tears"

/^luuk ˊraʔˋbɣɣt / "a bomb"

/ dɣɣn thaaŋ / "to travel"

If one takes /^khruaŋ ˊsak ^phaa / as an architype of compounds in (22a) and /ˇkhɔɔŋ ˊkhaaŋ kh ɯɯn / as an architype of compounds in (23b), (24a) and (24b) would be their surface structures respectively:

(24)
(a)
$$\left[_N \#\left[_N \#\ ^\wedge\ \text{khruaŋ}\ \#\right]_N \left[_V \#\left[_V \#\text{sak}\ \#\right]_V \quad \left[_N \#\ \text{phaa}\ \#\right]_N \#\right]_V \#\right]_N$$

(24)
(b)
$$\left[_N \quad \#\left[_N \#\left[_N \#\ \check{}\ \text{khɔɔŋ}\ \#\right]_N \quad \left[_V \#\ \acute{}\ \text{khaaŋ}\ \#\right]_V \#\right]_N \quad \left[_N \#\text{kh ɯɯn}\ \#\right]_N \#\right]_N$$

After this analysis, the accentual patterns in question may be arrived at by the instructions as outlined above:

(25)
(a)

^khr ɯaŋ ## ˊsak ## ^phaa #

1	1	1	(9a) first cycle
		1	(9a) second cycle
	2		(Convention (10) second cycle)
		1	(9a) third cycle
2	3		(Convention (10) third cycle)
2	3	1	

(25)
(b)

# # # ˊkhɔɔŋ # ˊkhaaŋ ## kh uuu n # #			
1	1	1	(9a) first cycle
	1		(9a) second cycle
2			(Convention (10) second cycle)
		1	(9a) third cycle
3	2	1	(Convention (10) third cycle)
3	2	1	

Let us now consider the following compounds:

(26)

/ˋhun ˆlaj kaa /	"a scarecrow"
/ˋdèk 2om m uuu /	"an infant"
/ˇs uu a kin wua /	"a game played on the chess board"
/ kaa ˊlak ˊnaam /	"syphoning"
//rotˋbot ˋtha2 ˇn on /	"a steam roller"

The accentual pattern for these compounds is 2 2 1. Unlike those compounds in (22a) and (22b), none of the components of each compound is any more closely linked with one than the other. Therefore, if we take /ˋhun ˆlaj kaa / as the archetype of compounds in (26) its surface structure would be (27a)

(27)
(a) $\left[_{N} \# \left[_{N} \# \text{ˋhun } \# \right]_{N} \quad \left[_{V} \# \text{ˆlaj } \# \right]_{V} \quad \left[_{N} \# \text{kaa } \# \right]_{N} \# \right]_{N}$

(27b) shows how its accentual pattern is arrived at:

/ˋhun ˆ laj kaa /			
1	1	1	(9a) first cycle)
		1	(9a) second cycle
2	2		(Convention (10) second cycle)
2	2	1	

5.3 Institutionalised Compounds

The term "institutionalised" is given to a special type of compound. Compounds of this type consist of two components, each one is monosyllabic and the accentual pattern of the whole compounds is 3 1 instead of 2 1. Examples of institutionalised compounds are given in (28)

/ rɔɔŋ ˊthaaw /	"shoes"
support feet	
/ klaaŋ wan/	"daytime"
middle day	
/ˇkhɔɔŋ ˇkhwan /	"a present"
thing guardian spirit	
/^m ɛɛ khun /	"a term used by a husband in
mother you	addressing his wife"
/ˋkhuat ˇloo /	"a type of jar, with narrow neck"
bottle jar	
/ˋkhaat thun /	"to make a loss in profit"
to be without capital	
/^tchɔɔp tcaj /	"to be pleased"
to like heart	
/ kin ^thii /	"to take up room"
eat place	
/^thaw ˋkap /	"to be equal to"
equal with	
/^haj kaan /	"to testify"
to give matter	
/ baaŋ thii /	"sometimes"
some occasion, time	
/ˋjaaŋ ˊnii /	"in this manner"
manner this	
/ˋjaaŋ raj /	"how"
/ dii ˋkwaa /	"better"

The term "institutionalised" [8] is given to this type of compound because their usage has become so institutionalised that the natives seem to treat them as if they were bisyllabic words. At first, it seems that one can treat institutionalised compounds as non monosyllabic words by entering them in the lexicon without any indication of their being compounds. Thus, each item will be subject to (8) (9a) and (9b) and Convention (10), in that order, and this process will generate the accentual pattern 3 1 which is what is required here. However, this suggestion has to be rejected because when the institutionalised compounds are reduplicated, they follow the reduplication rules for the compounds, which involve not only the phonological reduplication as in the case of non monosyllabic words, but also the semantic reduplication of one of the components (see below p 86).

One notices, however, that if one treats insitutionalised compounds as compounds, the accentual pattern one would have is 2 1. But the accentual pattern which occurs in an institutionalised compound is 3 1. What is needed seems to be an instruction for the operation of another operation of the convention (10). One notices also that to be able to distinguish this type of compound from ordinary compounds, the term "institutionalised" must be entered as one of the syntactic features in the lexicon. Thus a compound is either [+ institutionalised] or [- institutionalised]. One thus can translate this syntactic feature into the instruction needed here by giving the value of [+ institutionalised] as an extra word boundary on each side of the lexical item. The extra word boundary will give the instruction for another operation of the convention (10). The analysis of the institutionalised compound / r ɔɔ ŋ ˊthaaw / is given in (29)

(29) $\left[_{N} \# \left[_{N} \# \left[_{V} \# \text{r ɔɔ ŋ} \#\right]_{V} \quad \left[_{N} \# \text{ˊthaaw} \#\right]_{N} \#\right]_{N} \#\right]_{N}$

and its accentual pattern is arrived at in (30).

(30)

/ r ɔɔ ŋ	ˊthaaw /	
1	1	(9a) first cycle
	1	(9a) second cycle
2		(Convention (10) second cycle)
	1	(9a) third cycle
3		(Convention (10) third cycle)
3	1	

(31) In the two very fast styles of colloquial Thai, namely the Presto and the Prestissimo[9] styles, there is a tendency among the speakers to institutionalise all compounds which consist of two components, each of which is monosyllabic. Thus, while one contrasts in Allegretto the pattern 3 1 of the institutionalised compound /ˊkhaat thun / "to make a loss in profit" with the pattern 2 1 of the ordinary compound /ˊkhaat tcaj / "to die (for lack of oxygen)", one would use the same pattern: 3 1 for both compounds in Presto and Prestissimo styles. All compounds which have two syllables are therefore entered with the features [+ institutionalised] in Presto and Prestissimo styles.

5.4 Reduplicated Word Accent Placement Rules

In Thai, lexical items which belong to the major set of categories may be reduplicated. When the lexical item is monosyllabic, the reduplication may be either partial or complete. When the lexical item is non monosyllabic, its final syllable will be partially reduplicated while all non final syllables are completely reduplicated. Examples of the first two types are given in (31)[10].

(31)	Lexical Items	(a) Complete Reduplication[11]	(b) Partial Reduplication
/^juŋ /	"to be busy"	/^juŋ ^juŋ /	/^juŋ ^jiŋ /
/ mɔɔŋ /	"to look at"	/ mɔɔŋ mɔɔŋ /	/ mɔɔŋ miaŋ /
/^thaap /	"to put on top"	/^thaap ^thaap /	/^thaap thaam /
/ˋtcap /	"catch"	/ˋtcap ˋtcap /	/ˋtcap ˋtcot /

As one can see in (31a) a complete reduplication form in in fact a replica of the lexical item with regard to its segments and tone. The only difference is the degree of accent which is [Accent 3], while the lexical item which belongs to the major set has [Accent 1] by (9a). In partial reduplication in (31b), the reduplicated form retains (or reduplicates) the pre-syllabic segment (s) of the lexical item while there is a change in either the syllabic nucleus or the final segment or tone; or in all of these. The accentual pattern for the combination of the lexical item and its reduplicated form is 2 1. (31) contains examples of the reduplication of monosyllabic words, examples of the reduplicated forms of non monosyllabic words[11] are given in (32). Figures 1, 2, 3 etc. indicate the degree of accent on each syllable.

(32) (a) Lexical Items	(b) Reduplicated Words
3 1	4 2 4 1
/ˋkraʔ ˊsip / "to whisper"	/ˋkraʔ ˊsip ˋkraʔ ^saap /
3 1	4 2 6 1
/ˋpraʔ ˋtcop / "to ingratiate"	/ˋpraʔ ˋtcop ˋpraʔ tcaaŋ /
3 1	4 2 4 1
/ˋsaʔ ˋʔaat / "to be clean"	/ˋsaʔ ˋʔaat ˋsaʔ ^ʔaan /
3 1	4 2 4 1
/ˋkraʔ tcaaj / "to spread out"	/ˋkraʔ ˋtcat ˋkraʔ tcaaj /
3 1	4 2 4 1
/^kaw ^ʔitt / "a chair"	/^kaw ^ʔon ^kaw ^ʔii /
3 1	4 2 4 1
/ din ˇsɔɔ / "a pencil"	/ din ˇsoŋ ˇdin ˇsɔɔ /
3 3 1	4 4 2 4 4 1
/ˋpraat ˋthaʔ ˇnaa / "to wish"	/ˋpraat ˋthaʔ ˇnon ˋpraat ˋthaʔ ˇnaa /
3 3 1	4 4 2 4 4 1
/ˇphon ˊlaʔ ˊmaaj / "fruit"	/ˇphon ˊlaʔ ˇmoŋ ˇphon ˊlaʔ ˇmaaj /

One can see from (32) that the process of reduplication of the non monosyllabic words involves two types of reduplication, namely the partial reduplication of the last syllable of the lexical item and the complete reduplication of the rest of the segments in that lexical item.

It seems that in the reduplication process, the reduplicated form also reduplicates the degree of accent of the lexical item (which will be referred to, from now on, as the "base" form as opposed to the "reduplicated" form). Since one should regard the combination of the base and its reduplicated form as a word, they are consequently entered within word boundaries. This means that another operation of Convention (10) is required before the word boundaries can be erased. With the operation of Convention (10), all non final syllabic vowels have their accent reduced by one degree.

There is however one exception to this reduplication of accent. When a monosyllabic word is completely reduplicated, the accentual pattern for the combination of the base and its reduplicated form is 3 1. This means that the reduplicated form could not have reduplicated the degree of accent of the base (which is [Accent 1]); for then one would expect a pattern of 2 1. The reduplicated form must have [Accent 2] which is then reduced to [Accent 3] by Convention (10). One may thus capture the accent Placements Rule for reduplicated words, and the exception which has just been outlined by (33) . The completely reduplicated form of a monosyllabic word, in the process of reduplication , receives the feature [+ Cr] while all other types of reduplicated forms receive the feature [+R]. [Accent m] = the degree(s) of Accent of the lexical item which has been reduplicated.

(33)

$$V \longrightarrow \begin{cases} [\text{Accent } 2] \;/\; \ldots \underset{[+Cr]}{\bar{V}} \ldots & \text{(a)} \\ [\text{Accent } m]/ \;\; \ldots \underset{[+R]}{\bar{V}} \ldots \left(\ldots \underset{[+R]}{V} \ldots \right)^{*} & \text{(b)} \end{cases}$$

(34) and (35) are illustrations of accent placement in reduplicated words:

(34) ˆjuŋ Vi "to be busy"

Vi = ˆjuŋ Vi ˆjuŋ Vi Vi

1 (9a)

2 (33a)

3 (Convention (10))

3 1

(35) ˋkraʔ ˊsip

Vi Vi "to whisper"

ˋkraʔ ˊsip ˋkraʔ ˆsaap

Vi Vi Vi Vi

2 (8)

1 (9a)

3 (Convention (10) first cycl

3 1 (33b)

4 2 4 (Convention (10) 2nd cycle)

4 2 4 1

5.5 The Reduplication of Compound Words

Let us now look at the reduplication of compound words.

(36)

(a) (b)

/ˆmɛɛ ˆboŋ ˆmɛɛ ˆbaan / "housewives" /ˆmɛɛ ˆbaan ˆmɛɛ rɯan / "housewives"

/ˊjep ˆphaa ˊjep ˆphɔɔn / "to sew" /ˊjep ˆsɯa ˊjep ˆphaa / "to do some sewi

/ˊnaam toŋ ˊnaam taa / "tears" /ˊnaamˇ huu ˊnaam taa / "tears"

/ˇhaaj tcoŋ ˇhaaj tcaj /"to breathe" /ˇhaaj ˋʔok ˇhaaj tcaj / "to breathe"

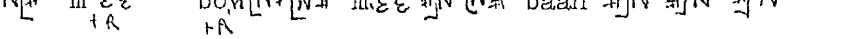
/ tham noŋ tham naa / "to grow rice"/ tham ˆraj tham naa / "to grow rice"

/ˊtchet toŋ ˊtchet tua /"to dry oneself" /tchetˇn ɯa ˊtchet tua/"to dry onese

/ˋpluuk ˆboŋ ˋpluuk ˆbaan/"to build a house" /ˋpluuk ˆbaan ˋpluuk ˆtchɔɔŋ / "to build a house"

The accentual pattern for each of the reduplicated compounds in (36) is 3 2 3 1. In the case of (36a) the process of reduplication is in fact of the type in (32), that is, the reduplication involves both the complete and the partial reduplications. The same Reduplication Word Accent Placement Rule, namely (33b) should therefore apply to compounds as well. But in the case of compounds, the reduplication takes place after the complete process of compounding and the reduplicated compound is also a word and, for example,

/^mɛɛ ^boŋ ^mɛɛ^baan / should therefore be labelled and bracketed as (37)

(37) 

Since the assignment of compounds has already been outlined under 5.2, we will take the accentual pattern of the compound noun /^mɛɛ^baan / which is 2 1 as our starting point here. The accentual pattern of the reduplicated word /^mɛɛ ^boŋ ^mɛɛ^baan / is assigned in (38)

(38)

/ ^m ɛɛ ^boŋ ^mɛɛ^ baan /		
2 1		(Pattern of compound /^mɛɛ^baan /)
2 1		(33b)
3 2 3		(Convention (10))
3 2 3 1		

The accentual pattern of all other reduplicated compounds in (36a) may be assigned in a similar way.

It seems obvious from (36a) and (36b) that the same compound may be reduplicated in two ways. One is the complete reduplication of the non final syllables followed by the <u>phonological</u> partial reduplication of the final syllable which is the case of all those items in (36a). The other type of reduplication of the compounds involves the complete reduplication of the non final syllables followed by what will be called "semantic partial reduplication" of the base component as in the case of those items in (36b).

There is a type of compound word which M. Haas called "Co-ordinate compounds"[12]. Each of the co-ordinate compounds contains two components, each of which is related to the other semantically:

(39)

/^baan r ɯa n /	"household"
house household	
/^s ɯa ^phaa /	"clothes"
blouse material	
/ taa ˇhuu /	"visual and auditory faculty"
eye ear	
/ˋʔok tcaj /	"feeling"
chest heart	
/^raj naa /	"cultivated land"
terrace, flat land	
/ˊn ɯa tua /	"body"
flesh body	

/^baan ^tchɔɔŋ / "house"
house slot

When one of the components of the co-ordinate compound occurs as the final syllable of another compound, like /^baan / in /^mɛɛ^ baan /; if this other compound (/^mɛɛ ^baan /) is to be reduplicated, /^baan / would then be the final syllable and its reduplicated form is always the other member of the co-ordinate compound in which it occurs, namely / r ɯan / or /^tchɔɔŋ /. As in the case of /^baan / a lexical item may have more than one other lexical item which it may co-ordinate with. The choice of which lexical item it will take as its reduplicated form is then determined by the semantic closeness among the items. Thus, /^baan / in /^mɛɛ^ baan / has the connotation of the household, / r ɯan / is therefore chosen for its reduplicated form. On the other hand, / baan / in /^pluuk^ baan / refers to the actual building, /^tchɔɔŋ / which as the feature [+ concrete] is then chosen as its reduplicated form. On the other hand, if the compound /^pluuk ^baan / is used with the implication that the house is built purposely for a newly-wed couple, then its reduplicated version would be:

/^pluuk ^baan ^ pluuk r ɯ an /

It seems obvious that the same accent placement rule which applies to reduplicated compounds in (36a) should also apply to those in (37b), since they both have the same accentual pattern, namely 3 2 3 1; the only difference is the way the base component is reduplicated. There seems to be no need to have a different accent placement rule for reduplicated compounds of the type (36b). The only thing which is required is the extension of the notion "partial reduplication" to have both the phonological and the semantic values.

Under 5.3 we mentioned another type of compound, namely the institutionalised compounds. It seems that the institutionalising process and the reduplicating process are in disjunctive order. That is to say, a compound may be either institutionalised or reduplicated, but never both. The reason for this is obvious since the process of reduplication takes place immediately after the completion of the compounding as shown in (37). This

means that the process of institutionalising must take place after the reduplication; but one of the conditions for a compound to be liable to being institutionalised is that it must contain no more than two syllables. A reduplicated version of a compound would have at least four syllables, and this makes the process of instituionalising impossible. (40) contains the reduplicated versions of compounds which, otherwise, are institutionalised:

(40)

/ kin ^thii kin thaaŋ / "to take up a lot of room"

/ ^tchɔɔp ˋʔok ^tchɔɔp tcaj / "to be extremely pleased"

/ ˋˋkap ^khaaw ˋkap plaa / "meat and vegetable dish"

The final syllable of each compound in (40) may also be phonologically reduplicated although no examples are given here since the operation is identical with that for (36a). The accentual pattern for each utterance in (40) is 3 2 3 1 which is arrived at through the same process as the utterance in (38).

(40) also illustrates the point mentioned on p.79 namely the reason for not treating an institutionalised compound as a disyllabic (simple) word, when the two in fact do share the same accentual pattern. When a simple word is reduplicated, the reduplication of the base component is always phonological and never semantical (for the definition of phonological reduplication and semantical reduplication, see p. 81 and p. 84-5 respectively). The institutionalised compound may have both the phonological REDUPLICATED form and the semantical reduplication form of the base component.

5.6 Phrase Accent

One may recall the author's review of Thawisomboon's work[13] in Chapter II, pp. 32-38. In his work, Thawisomboon recognises "phrase stress" in assigning to the final syllable of a phrase a higher degree of stress than the degree it would have in the non phrase final position. The reason behind this is the fact that the duration of the syllable in this position is usually lengthened. The author feels that the lengthening process is closely associated with intonation rather than accent. In the Thai language, there

are two systems for showing politeness. One is to use the polite sentence final particle[14]; the other is to lengthen the duration of the final syllable in the phrase.

Example:

(a) / dii tcaj ˇmaj ´kha? / "Are you pleased?"

(b) / dii tcaj ˇmaj / "Are you pleased?"

This lengthening of the final syllable does not take place when the speaker is rude, impolite or being sarcastic. On the other hand, this lengthening process happens to both accented and unaccented final syllables of a phrase and cannot, therefore, be contrastive. Moreover, in the author's system, length is only one of the phonetic correlates to [Accent] . The lexical item /ˇmaj / to which Thawisomboon assigned a secondary stress (see p. 37 of this thesis) has other phonetic features which are closely related to unaccented syllables. Its pitch contour is a high or high rise as opposed to the low rising contour as specified in its phonological representation. The syllabic nucleus is [æ] as opposed to the diphthong /aj/ in the lexical representation. For the reason just given, the author has decided that there is no phrase accent in Thai.

5.7 Summary

One may summarise the situation of accent placement in Thai as follows:

The final syllabic vowel of lexical items receives Accent 1 if the lexical item is one of the major categories and [Accent 3] if the lexical item is one of the minor categories. All other syllabic vowels in the same lexical item receive [Accent 2]. Whenever one comes across the word boundaries (# #), all non final syllabic vowels within the word boundaries have their accent reduced by one degree. If the lexical item is reduplicated, Reduplicated Word Accent Placement Rules operate after the application of simple word Accent Placement Rules above. The formation of the lexical item and its reduplicated form are placed between another pair of word boundaries and the feature [+Cr] or [+R] as the case may be, is assigned to the reduplicated. Reduplicated word Accent Placement Rules then give an instruction that the

reduplication of the lexical item also reduplicates the accentual pattern of the lexical item in all cases, with one exception, which is the completely reduplicated form of a simple monosyllabic word receives [Accent 2] . After the operation of the Reduplicated Word Accent Placement Rules, all non final syllabic vowels within the word boundaries have their accent reduced by one degree and then the word boundaries are erased. There has been no need for postulating Compound Word Accent Placement Rules, since the accentual pattern for a compound may be assigned by the same rules for simple words and by the application of the Convention (10) to all the non final syllabic vowels every time one comes across the word boundaries.

Summary of Rules

(41)

(8)

APR I: $V \longrightarrow$ [Accent 2] $/ \# C_1\left(\begin{Bmatrix} L \\ W \end{Bmatrix}\right) \bar{V} (G_1)\left(\begin{Bmatrix} G_2 \\ C_2 \end{Bmatrix}\right)\left(C_1\left(\begin{Bmatrix} L \\ W \end{Bmatrix}\right) V (G_1)\left(\begin{Bmatrix} G_2 \\ C_2 \end{Bmatrix}\right)\right) \#$

APR II: $V \longrightarrow$

[Accent 1] $/ \# X \ Y \ Z \ \bar{V} \ (C) \ \#$ major set (a) (9a)

[Accent 3] $/ \# X \ Y \ Z \ \bar{V} \ (C) \ \#$ minor set (b) (9b)

(10)

APR III

[Accent n] $\rightarrow$ [Accent n+1] $/ \# C_1\left(\begin{Bmatrix} L \\ W \end{Bmatrix}\right) \bar{V} (G_1)\left(\begin{Bmatrix} G_2 \\ C_2 \end{Bmatrix}\right)\left(C_1\left(\begin{Bmatrix} L \\ W \end{Bmatrix}\right) V (G_1)\left(\begin{Bmatrix} G_2 \\ C_2 \end{Bmatrix}\right)\right) \#$

APR IV: $V \longrightarrow$

[Accent 2] $/$ $\underset{[+\,Cr]}{\ldots\bar{V}\ldots}$ (a) (33a)

[Accent m] $/$ $\underset{[+\,R]}{\ldots\bar{V}\ldots}$ $(\ldots V\ldots)^*_{[+\,R]}$ (b) (33b)

Footnotes V

1. Chomsky and Halle : SPE, p. 15.

2. This study makes no distinction between native words and those words which are known historically to be loans from Sanskrit, Pali or Chinese, since in the majority of cases, the same Accent Placement Rules apply to both. However, the syntactic feature [+foreign] may be assigned to certain loanwords which are exceptionsto the tone changing rules (see Chapter VIII, p. 178, 181.

3. It is difficult to translate Thai sentence particles into English. By analogy, they correspond with English intonation in some cases; while in other cases, are associated with certain sentence types such as a question, a command etc.

4. Chanthavibul V: Inter-Sentance Relations, p. 161 - 232.

5. Chanthavibul V, op.cit. p. 210 - 211.

6. The meanings of these compounds have already been given in Chapter III, p. 46-50.

7. Since [Accent]is a phonetic feature, it operates in an n-ary system. However, as shown by Lieberman's experiment on the linguists' perception of English stress, it is doubtful that without the knowledge of the language, one would be able to distinguish, from the physical properties of the utterance, any more than two degrees of accent. See Lieberman (1961)

8. The term "institutionalised" is borrowed from G.B.Downer(1961) who uses the term in referring to certain "constantly recurring collocations (which) occurred very often with extremely reduced forms...(because they) were more 'institutionalized' than others " (p.540).

9. See the five levels of styles on p. 9.

10. For the semantic function of reduplication in Thai, see K. Nacaskul :(1962) A Cognate Study of Cambodian and Thai Words, p. 106 - 108.

11. As can be seen in (32b), the order of the base and its reduplicated form is determined by the number of sonorant segments in the syllabic cluster. The item which contains the greater number of sonorant segments will occur last.

12. Haas M. Thai - English Student Dictionary,(196) p. xvii

13. Thawisomboon S : Syllable Junctions within stress.Groups in Spoken Thai."

14. This is only one use of sentence particles in spoken Thai. E.J.A. Henderson (1949,p. 205-6) has summarized the use of sentence particles in spoken Thai as follows : " Such particles serve several purposes. Firstly, by their presence they mark the end of a sentence, or, in the case of /^kɔ /, signal the beginning of a clause or sentence which is linked with one which has gone before. They also add someting to the general meaning of the sentence. They may, for instance, soften a command, indicate a question, or proclaim the sex and social status of the speaker." A detailed study of Thai sentence particles is T. Chuenkongchoo (1956) " The prosodic Characteristics of Certain Particles in Spoken Thai". Henderson also remarks that some particles are spoken with certain sentence tones and with shortness to give the impression of(i) casualness (ii) impatience, abruptness, exasperation or mild command (iii) assertion, or assent, or command and (iv) interrogation, invitation (less formal). In other words, sentence final particles may or may not be lengthened, depending on the context and the speaker's attitude and this seems to support the author's analysis that length in this context is connected with intonation and not with [Accent] .

CHAPTER VI

PHONETIC REALIZATION RULES: Length

6.0 In this chapter, we are interested in phonetic realization rules which will subsequently be called: "length assignment rules." In Chapter I the feature length has not been postulated among the distinctive features. The justification for the treatment of the length contrast between vowels as the difference between a single vowel and a sequence of two identical vowels has already been given on pages 11-12. However, at the phonetic level this feature is needed since the difference in length among the vowels and the final segments in syllables with different degrees of accent is clearly perceptible. The situation is further complicated by three other factors. First, as mentioned before, there is already a length contrast between a single vowel and a sequence of two same vowels. For example:

(1)

/ˋkak / "to hold for ransom"

/ˆkaak / "dregs, (tea) leaves"

Secondly, as shown in the measurements done by A.S. Abramson[1], there is the basic difference in length between different single vowels or different geminated vowels. The duration of /o/ for instance, is shown to be almost twice as long as the duration of /i/.[2] Thirdly, also shown by Abramson[3], the durations of the same vowel with different tones also vary a great deal; thus the high tone and the falling tone have a much shorter duration than any of the durations of the same vowel with other tones.[4] If one is to postulate length as a feature and to correlate it with the varying degrees of accent, these factors have to be taken into account. The data to be examined should therefore be identical with regards to their segmental features and their lexical tones. However, it is not always possible to fulfil all these requirements, as only some lexical items can have all the three degrees of accent[5] on them. To solve this problem, one admits among the data, lexical items with the same vowels, final consonant and tone but with different initial consonants and different degrees of accent to be compared. The

initial consonants are then not taken into account, for being different, they are not comparable.[6] The same tempo "Allegretto" (see p.9) is used throughout the experiment[7].

Thus, measurements were made of the vowels and the final consonants of ten types of syllable structures which have fulfilled all the requirements stated above. The 10 types of syllables are:

(2)

(1) C ($^{L}_{w}$) V ʔ	(2) C ($^{L}_{w}$) V G_1
(3) C ($^{L}_{w}$) V /j/	(4) C ($^{L}_{w}$) V G_1 /j/
(5) C ($^{L}_{w}$) V /w/	(6) C ($^{L}_{w}$) V G_1 /w/
(7) C ($^{L}_{w}$) V N	(8) C ($^{L}_{w}$) V G_1 N
(9) C ($^{L}_{w}$) V S	(10) C ($^{L}_{w}$) V G_1 S

(N = nasal)

(S = segment [+ obstruent])

(G_1 = nonsyllabic geminated vowel.)

The ten tables in the following pages show these measurements[8] in non-phrase final positions. However, there are certain points which should be mentioned about the way the measurements were made. The utterances containing the data to be examined were recorded in to the K-sonograph (see 1.6) which produced the graphic representations of the same utterances on a sonograph sheet. The measurements were then made, using the sonograph grid which gives the time scale, in centisecond units. The transition from the initial consonant other than /j/ and /w/ is included in the duration of the vowel. In the case when one of the semi vowels precedes, the first vowel then starts from the point where the first and second formants of that vowel appear on the sonograph[8]. When the liquid (^{L}) which is either /l/ or /r/ is present, there is usually a voice bar before the starting point of the vowel; if this is the case, then the starting point of the first vowel poses no problems. However, in some cases, such points of division between the glide and the following vowel may not be accurately determined, then the measurements are taken from the point where the voicing starts in all the data to be compared. The terminal point

for the duration of the vowel is determined by the nasal bar when a nasal consonant follows, by the cessation of all the formants when a stop consonant follows and by the end points of the first and second formants of the vowel when it is followed by one of the non-syllabic vowels (w, j, ə). However, in Tables 6.3, 6.6 no accurate divisional point between the two vowels is possible since in most cases their formants show glides of the transitional phases. In this case the measurement made of the duration of each syllable with the exclusion of the initial segment. For all cases, measurement is made only once on each spectogram, but the average for each group - which consists of 7 items - is given at the bottom of each table. Tables 6.1-10 on p. 94-98 give the measurements of the durations of the syllabic nucleus and the final segment in syllable types 1-10 as given in (2) on p. 92. In the tables, the following symbols are used :

V = syllabic nucleus

G_1 = nonsyllabic V

G_2 = nonsyllabic vowel which differs from the syllabic nucleus in terms of its articulation.

S = stop consonant

N = nasal consonant.

TABLE 6.1

	Accent 3		Accent 2			Accent 1	
	V	ʔ		V	ʔ	V	ʔ
1. /phrɔ̀ʔ ^waa	8	0	/khrɔ̀ʔ /raaj	10	7	/khrɔ̀ʔ /raaj	13	14
2. /lɛ̀ʔ ^mɛɛ	6	0	/nɛ̀ʔ nam	8	8	/nɛ ʔ ^waa	10	6
3. /lìʔ kee	4	0	/rìʔ ^rɤɤm	9	8	/rìʔ dii	12	10
4. /phraʔ ˇsaaw	4	0	/phraʔ ˇsaaw	11	8	/phraʔ ˇruuu	13	17
5. `tchaʔ /nan	6	0	`saʔ ˇsaaŋ	6	8	`tchaʔ lɣɣj	11	15
6. /thaʔ lee	4	0	/raʔ /jàʔ thaaŋ	9	7	`paʔ /thaʔ lɤɤj	12	11
7. `saʔ kon	6	0	`saʔ ˇsom	7	5	`saʔ ˇphom	9	8
Total	38	0		60	51		80	81
Average	5.4	0		8.6	7.3		11.5	11.6

TABLE 6.2

	Accent 3		Accent 2			Accent 1	
	VG_1			VG_1			VG_1
1. ^phaa `kaw	5		^phaa `kaw	12		^phaa `kaw	24
2. ^mɛɛ ^baan	8		^mɛɛ ^baan	11		^mɛɛ ^baan	24
3. kaa `faak	7		naa /lìʔ kaa pluk	14		naa /lìʔ kaa	25
4. ˇrɯɯu /khaʔ	7		ˇnaŋ ˇsuuu phim	10		ˇnaŋ ˇsuu `pluk phim	27
5. khruu `jaaj	6		khruu `jaaj	10		khruu `jaaj	18
6. `kɛɛ ˇkhaw	8		`kɛɛ `dɛɛt	18		`kɛɛ paj	25
7. ^thii `kɤɤt	5		^thii `kɤɤ t	9		^thii `kɤɤt	17
Total	46			84			160
Average	6.6			12			22.7

Time in centisecs.

TABLE 6.3

	Accent 3		Accent 2			Accent 1		
		VG_2		V	G_2		V	G_2
1.	ˇmaj ˊkha?	6	ˇmaj thaj	5	9	ˇmaj khraj	7	11
2.	ˋsaj ˋsaj	7	ˋsaj khwaam	5	5	ˋsajˋsajˆkhaw	8	12
3.	ˋplɔjˋplɔj	8	ˋplɔj tua	5	9	ˋplɔjˋplɔj pa j6		12
4.	ˋkepˊwajˋkɔɔn	5	ˊwaj tua	6	8	ʔawˊwajˋkɔɔnll		11
5.	jaj bua	7	jaj bua	5	7	jaj bua	9	14
6.	ˆmajˋkhɔj dii	7	ˆthɔj thii	8	9	ˆmajˋkhɔj dii	8	12
7.	tɕaj dii	8	tɕaj dii	8	9	tɕaj dii	12	13
	Total	48.0		42	56		61	85
	Average	6.9		6	8		8.7	12.1

TABLE 6.4

	Accent 3		Accent 2			Accent 1		
		VG_1G_2		VG_1	G_2		VG_1	G_2
1.	laaj thɛɛŋ	7	laaj thɛɛŋ	10	6	laaj thɛɛŋ	19	10
2.	ˊkhlaajˊkhlaaj	4	ˊkhlaaj khluuŋ	11	9	ˊkhlaajˊkhlaaj kan	17	10
3.	khɔɔj duu	7	lɔɔj ˆnaa	8	6	khɔɔj duu	14	9
4.	prooj prooj	8	prooj praaj	9	7	prooj duu	13	7
5.	phaaj ˆnaa	8	phaaj ˆnaa	8	7	phaaj ˆnaa	18	7
6.	ˋnuajˋnuaj	8	ˋnuajˋʔɔɔn	9	8	ˆnuaj ˆmaak	13	7
7.	ˇsaaj taa	8	ˇsaaj taa	9	11	ˇsaaj taa	18	10
	Total	50		64	54		112	60
	Average	7.1		9.1	7.7		16	8.6

Time in centisecs.

TABLE 6.5

	Accent 3		Accent 2			Accent 1		
	V.	G_2		V.	G_2		V.	G_2
1. ˇkhaw din	5		ˇsaw ^baan	5	12	ˇkhaw ˇsuun	10	15
2. ^thaw ˋkap	7		^thaw thun	5	7	^thaw kan	8	13
3. ^khaw tɕaj	4		^khaw tɕaj,	8	9	^khaw tɕaj,	8	14
4. dɣɣn ^khaw maa	5		^tɕ aw ^baan	8	7	^khaw ^baan	11	16
5. ʔaw tɕaj	4		ʔaw tɕaj	9	8	ʔaw ŋɣɣn	9	13
6. ^wɛw ^wɛ w	9		^kɛwˇhuu	9	14	^w ɛ w maa	11	13
7. ˋkaw ˋkaw	8		ˋkaw ˋkɛɛ	8	11	ˇkaw ˋkaw´naʔ	9	13
Total	42			52	68		66	97
Average	6			7.5	9.7		9.4	13.9

TABLE 6.6

	Accent 3			Accent 2			Accent 1		
	V	G_1	G_2		V	G_1		V	G_2
1. leew leew	10			leew saam	8	7	leew ^maak	10	9
2. jaaw jaaw	4			jaaw ˋjiat	8	6	jaaw jaaw naʔ	14	9
3. ˇkhaaw ˇkhaaw	6			ˇsaaw ˋkɛɛ	8	6	ˇkhaaw, ˇkhaaw dii	16	6
4. ˋklaaw ˋklaaw	5			ˋklaaw ´raaj	8	7	ˇklaaw, ˋklaaw kan	14	7
5. raaw tii ˋsii	7			raaw ^phaa	9	7	raaw ^nii	13	6
6. waaw waaw	6			waaw ´wap	10	6	´waaw, waaw dii	15	10
7. ´tchaaw ´tchaaw	7			´tchaaw^m uu t	7	7	´´tchaaw ´tchaaw nii	17	7
Total	45				58	46		99	54
Average	6.4				8.3	6.6		14.2	7.7

Time in centisecs.

TABLE 6.7

	Accent 3		Accent 2			Accent 1		
		V.	N		V.	N		V.	N
1.	tcon taaj	5	7	Khon tcon	5	9	tcon ˋtcaʔ ˋjɛɛ	7	13
2.	khoŋ paj		7	khoŋ thii	7	12	khoŋ* paj	10	15
3.	^taŋ ˋpɛɛ t^mɔɔ	4	6	^taŋ ^ton	8	11	^taŋ ˋpɛɛ t^mɔɔ	9	13
4.	ˋtok loŋ paj	5	9	loŋ khɔɔ	8	10	ˋtok loŋ paj	8	14
5.	paj ˇthuŋ ^baan	8	5	ˇthuŋ ^thii	7	11	ˇthuu n ^baan	7	14
6.	kan tchon	4	6	kan tchon	6	10	kan tchon	10	14
	Total	26	40		41	63		51	83
	Average	5.2	6.9		6.9	10.3		8.5	13.8

TABLE 6.8

	Accent 3			Accent 2			Accent 1		
		VG,	N		V G,	N		VG,	N
1.	ˇmuan kan	4	6	ˇmuan ˇmaaj	8	9	ˇmuan kan	14	9
2.	thaaŋ ˋpliaw	4	8	ˋthaaŋ ˋpliaw	6	9	thaaŋ ˋpliaw	15	9
3.	khwaam dii	6	6	khwaaw dii	8	9	ˋsaj khwaam dii*	14	10
4.	ˊtchaaŋ phaŋ	5	7	ˊtchaaŋ phaŋ	9	4	ˊtchaaŋ ˊphaŋ	19	6
5.	ˊkhaaŋ khuuun	8	5	ˊkhaaŋ khuuun	9	7	ˊkhaaŋ ^khaʔ	19	7
6.	dɣɣn thaaŋ	5	5	nɣɣn thɔɔŋ	8	10	nɣɣn thɔɔŋ*	12	11
7.	thaaŋ klaj	4	8	thaaŋ ˊklaj	8	9	thaaŋ ˊklaj	12	8
	Total	36	45		56	57		105	58
	Average	5.1	6.4		8	8.1		15	8.3

Time in centisecs.

TABLE 6.9

	Accent 3		Accent 2		Accent 1	
	V	S	V	S	V	S
1. ˋpak ˇsaa	5	7	ˋpak tcaj	10	6	ˋpak ˇsaw	10	15
2. ˋtat ˇsin	7	-	ˋtat ˇsin	7	16	ˋtat ˇsin*	8	20
3. ˋkap ˊnɔɔŋ	4	5	ˋtap ˋlek	7	10	ˋtap ˋlek	10	18
4. ˊtchak ^waaw	6	54	ˊtchak ^waaw	10	7	ˊphak ˇsaa*	8	16
5. ˊrak ˇsaa	4	5	ˊrap ˇsaaj	6	9	ˊrap ˇsaaj	9	12
6. ˋprap ˇmaj	5	9	ˋprap ˇmaj	6	10	ˋprap ˇmaj	6	15
7. ˋkat fan	7	7	ˋkat fan	8	12	ˋkat fan	10	15
Total	38	37		54	70		61	111
Average	5.4	6.2		7.7	10		8.7	15.8

TABLE 6.10

	Accent 3		Accent 2		Accent 1	
	VG$_1$	S	VG$_1$	S	VG$_1$	S
1. ˋtcaak muaŋ	5	4	ˋfaak ˇfaŋ	12	9	ˋfaak ˇfaŋ	17	8
2. ˋpaak ˇwaan	6	6	ˋpaak ˇwaan	15	8	ˋpaak ˇwaan	18	10
3. ^waat ^ruup	6	7	^waat ^ruup	14	9	^waat ^ruup	16	11
4. ˋʔɔɔk maa	7	6	ˋʔɔɔk rooŋ	12	7	ˋʔɔɔk maa	15	6
5. ^luuk ˋbit	5	7	^luuk ˋbit	14	7	^luuk ˋbit	18	8
6. ˋpɔɔt buam	5	7	ˋpɔɔt buam	14	8	ˋpɔɔt buam	19	7
7. ˋduut ˋfun	6	7	ˋduut ˋfun	15	7	ˋduut ˋfun	18	10
Total	40	44		96	55		121	60
Average	5.7	6.3		13.7	7.9		17.3	8.6

Time in centisecs.

6.1 Length in the final consonants

At this point, let us consider just the durations of the final stops and final nasals which are segments with the features $\begin{bmatrix} - \text{ syllabic} \\ + \text{ consonantal} \end{bmatrix}$. Their durations are shown in Table 6.11 below. Their measurements are taken from the average given in Tables 6.1 - 6.10.

TABLE 6.11

Syllable Types	Accent 3	Accent 2	Accent 1
VN	6.9	10.3	13.9
VS	6.2	10.0	15.8
VVN	6.4	8.1	8.3
VVS	6.3	7.9	8.6

(Time in centisecs)

From the figures above, together with the evidence from the relative durations of the vowels, it seems that one needs to postulate only three degrees of length contrasts for the final consonants. The figures above seem to suggest the following groupings:

TABLE 6.12

Length 1	Length 2	Length 3
6.9	10.3	13.9
6.2	10.0	15.8
6.4	8.1	
6.3	7.9	
	8.3	
	8.6	

(Time in centisecs.)

The grouping is by no means arbitrary. In Table 6.11, the duration of the final consonant after a single vowel with [Accent 1] is almost twice as long as the duration of the final consonant after a sequence of two identical vowels. One may in fact postulate such a rule as (3).

(3) $$C \longrightarrow C\ C \ / \ \underset{[\text{Accent 1}]}{V} \ \_\_\_\_$$

On the other hand, when the syllables with a single vowel which is followed by a final consonant which bears [Accent 2] the duration of the final consonant has been perceived to be shorter than that after a single vowel with [Accent 1], and yet not as short as the duration of the final consonant after a single or a double vowel (s) with [Accent 3].[9] One may induce from this perception that the length of the final consonant after a single vowel with [Accent 2] is the same as that of a final consonant after a sequence of two identical vowels with [Accent 1]. In fact, if one postulates three degrees of length contrast in the final consonant, then one does not need the rule which has been formulated in (3). The length feature may be assigned by the following three rules:

(4)

$$C \longrightarrow [\text{length 3}] \ / \ \underset{[\text{Accent 1}]}{V} \ \_\_\_\_$$

(5) $C \longrightarrow [\text{length 2}] \;/\; \left\{ \begin{matrix} V \\ [\text{Accent 1}] \\ V \\ [\text{Accent 2}] \end{matrix} \right\} \ldots G_1 \;\_\_\_\_$ (a)

(6) $C \longrightarrow [\text{length 1}] \;/\; \begin{matrix} V \\ [\text{unaccented}] \end{matrix} \;\_\_\_\_$ (b)

(4), (5) and (6) may be abbreviated into (7);

(7)

$$C \longrightarrow \left\{ \begin{matrix} [\text{length 3}] \;/\; \begin{matrix} V \\ [\text{Accent 1}] \end{matrix} & & & (a) \\ [\text{length 2}] \;/\; \left\{ \begin{matrix} V \\ [\text{Accent 1}] \\ V \\ [\text{Accent 2}] \end{matrix} \right\} & G_1 & \_\_\_\_ & (b)\ (c) \\ [\text{Length 1}] \;/\; \begin{matrix} V \\ [\text{unaccented}] \end{matrix} & & & (d) \end{matrix} \right.$$

Rule (7) holds for every syllable ending with a segment with the feature [+ cons], namely one of the nasals or the stops. If one looks at the length situation in syllables ending with one of the semi vowels (/j,w,/), it seems that (7) also applies to them:

TABLE 6.13

Syllable Types	Length of the non-syllabic vowel		
	Accent 3	Accent 2	Accent 1
Vj	-	8	12.1
Vw	-	9.7	13.9
VVj	-	7.7	8.6
VVw	-	6.6	7.7

(Time in centisec.)

The presence of /j,w/ after an unaccented vowel is shown by the transition, although no accurate measurement may be made, in the allegretto style[10]. Thus, one may extend (7) to syllables with the semivowel ending by having a notational device which says

(8)

$$\begin{bmatrix} -\text{syl} \\ -\text{cons} \end{bmatrix} = C \;/\; V \;(G_1) \;\_\_\_$$

Which is in fact how traditional Thai grammar treated initial and final semivowels. (8) however also includes the glottal stop among the C symbol; but if one looks at Table 6.1, it seems that (7a) and (7c) hold for syllables with a final glottal stop. (7d) however does not apply since the glottal stop is deleted after an unaccented vowel. Thus, one needs the rule in (9):

(9)

$$\begin{bmatrix} -\text{syl} \\ -\text{cons} \\ -\text{son} \end{bmatrix} \longrightarrow \emptyset \;/\; \underset{[\text{unaccented}]}{V} \;\_\_\_$$

The condition that the segment must be [-son] states that the semivowels (j,w,/ which are [+son] are not subjected to (9).

6.2 Length Assignment in Vowels

Let us now look at the durations of the syllabic nuclei which bear various degrees of accent. The durations are compared in Table 6.14. (The figures are taken from the average durations in Tables 6.1 - 6.10)

TABLE 6.14

Syllable Types	Accent 3	Accent 2	Accent 1
V2	5.4	8.6	11.4
Vj	6.9	6.0	8.7
Vw	6.0	7.5	9.4
V N	5.7	6.9	8.5
V S	5.4	7.7	8.7
V, G_1	6.6	12.0	22.7
$V\ G_1$ j	7.1	9.1	16.0
$V\ G_1$ w	6.4	8.3	14.2
$V\ G_1$ N	6.4	8.0	15.0
$V\ G_1$ S	6.4	10.9	17.3

(Time in centisec.)

If one looks at the right-hand column of Table 6.14 one finds that the duration of the sequence of two vowels in all cases roughly has the ratio of 2:1 to the duration of the corresponding single vowel. On the other hand, in Table 6.2 the ratio of the duration of the sequence of two vowels in the open syllable and the duration of the same vowels in the closed syllable is 4:3. If one postulates 5 degrees of length contrast to the vowel, [length 5] would be assigned to the sequence of two identical vowels with [Accent 1] in the open syllable (which has the average duration of 22.7 centisec.) [Length 4] would be assigned to a sequence of two vowels with [Accent 1], in the closed syllable (with the average duration between 14.2 to 17.3 centisec.) Since there seems to be no basic difference in duration between a single vowel with [Accent 1] and a sequence of two vowels (in open or close syllable) with [Accent 2], it seems reasonable to assign [length 3] to both of them. (The two types of syllables, incidentially, are already contrasted by the length in the final consonant where it is relevant, by (7a) and (7d)). A single vowel with [Accent 2] then receives [length 2]. All unaccented vowels receive [length 1]. The length assignment for the vowels may be stated by rules (10) to (15):[11]

(10) $\underset{[\text{Accent 1}]}{V} \longrightarrow [\text{length 5}] \;/\; \_\_\_\_ \; G_1$

(11) $\underset{[\text{Accent 1}]}{V} \longrightarrow [\text{length 4}] \;/\; \_\_\_\_ \; G_1 \; C$

(12) $\underset{[\text{Accent 1}]}{V} \longrightarrow [\text{length 3}] \;/\; \_\_\_\_ \; C$

(13) $\underset{[\text{Accent 2}]}{V} \longrightarrow [\text{length 3}] \;/\; \_\_\_\_ \; G_1 \; C$

(14) $\underset{[\text{Accent 2}]}{V} \longrightarrow [\text{length 2}] \;/\; \_\_\_\_ \; C$

(15) $\underset{[\text{Accent 3}]}{V} \longrightarrow [\text{length 1}] \;/\; \_\_\_\_$

Although it is desirable to compare these length assignment rules with Gillette's types of syllable length as given on page 40 in Chapter II of this thesis, the author has found this to be impossible due to the different stress assignment system used by Gillette. Moreover, Gillette gave the length of the whole syllable while the author gives separate treatments for the vowel and the final consonant; and although it is possible to add up the length units as assigned to the vowel and the final consonant in various types of syllables to compare with the syllable lengths as given by Gillette, this process is not advisable. According to recognition tests carried out by Abramson[12], the duration of a double vowel in Thai need not be twice as long as the duration of the identical single vowel. When the duration is about 3:2 of that of the identical single vowel, the native speaker can already identify it as a double vowel. However, where comparison is possible, it is true to say that there are two points in the author's length assignment which correspond with the syllable length as given by Gillette namely (a) the distinction between V and VV in unaccented syllables is lost and (b) one of the longest syllables is the type VVC with [Accent 1][13].

As a summary, the length of syllables as assigned by the length assignment rules may be given in Table 6.15 below in which the figure in the brackets ( ) represent the degree of length of the segment in question:

TABLE 6.15

Types of Syllables	Accent 3	Accent 2	Accent 1
V	V ʔ (1) (0)	V ʔ (2) (2)	V ʔ (3) (3)
VV	VV (1)	V V (3)	V V (5)
Vj	V j (1) (1)	V j (2) (2)	V j (3) (3)
VVj	VV j (1) (1)	V V j (3) (2)	V V j (4) (2)
Vw	V w (1) (1)	V w (2) (2)	V w (2) (3)
VVw	VV w (1) (1)	V V w (3) (2)	VV w (4) (2)

TABLE 6.1.5 (con'd)

Types of Syllables	Accent 3	Accent 2	Accent 1
VN	V N (1) (1)	V N (2) (2)	V N (3) (3)
VVN	VV N (1) (1)	VV N (3) (2)	VV N (4) (2)
VS	V S (1) (1)	V S (2) (2)	V S (3) (3)
VVS	VV S (1) (1)	VV S (3) (2)	VV S (4) (2)

Footnotes VI

1. A.S. Abramson (1962) Acoustic measurement of Vowels and Tones in Standard Thai.
2. A.S. Abramson op.cit. Table 2.1. p. 81-83
3. It should be pointed out, however, that Abramson's measurements were made from the citation forms of the single vowels and that no consideration of the syllable structure was taken (i.e. open or close syllables). The author, in her measurements of the durations of the vowels in connected speech, finds the same phenomena, namely the basic difference in length between different vowels and the difference in length of the same vowel when it bears different tone.
4. A.S. Abramson, (1962) Table 2.7 , p. 108
5. In this chapter , the author will study syllables with [Accent 1] , [Accent 2] and [Accent 3] only; since it is doubtful if the difference in length between syllables with [Accent 3] and those with [Accent 3 +] would be at all perceptible.
6. Measurements have shown that there is also a basic difference in duration between different initial consonants. The fricatives /f/,/s/,/h/ for instance, have a much longer duration than the nasals or the stops.
7. The basic difference between Allegretto , Presto and Prestissimo styles, as will be seen in Chapter VII, lies in the fact that in the Presto style, there are certain changes in segmental features, which do not take place in the Allegretto style; while in the Prestissimo style, certain segments are deleted resulting in a shorter duration of the syllable or even the loss of a syllable in some case (see p. 134-7)
8. For the three formants of the short vowels / i e ɛ a u ɯ o ɣ ɔ/ see Table 7.2 on p 115
9. The longer duration of the final consonant in syllables with [Accent 1] is also supported by Thawisomboon's experiment with the use of the palatogram (see p. 33 of this thesis) where he found that the contact of the final consonant was more firm in stressed syllables.
10. See the spectrogram of / ^maj ^maj / in Fig. 7. 3 on p. 118
11. Admittedly, certain generalization is lost in stating the length assignment for the vowel in 6 separate rules since there are certain relationswhich hold among rules (11),(12), (13), and (14).

Rule (11) has the same environment as rule (13) and the relationship between those two rules is that when the degree of [Accent] in (11) is reduced by one degree (from [Accent 1] to [Accent 2]), then the degree of [length] which is assigned to the vowel is also reduced by one degree (from [length 4] to [length 3]). The same may be said of rules (12) and (14). To state this generalization, one would require a rule which the author feels would be too powerful for our present purpose. On the other hand, although one may conflate rule (11) with rule (12) and rule (13) with rule (14), the author has not done so ; since the generalization mentioned above may be more easily drawn by separating the four rules.

12. Abramson (1962) p. 95 - 102

13. In fact, if one looks at the following TABLE 6.15, syllables with [Accent 1] of the types V C and V G_1 C are all equally long having 6 units of [length] .

CHAPTER VII

PHONETIC REALIZATION RULES : Segmental changes.

7.0. In this chapter, we will look at the changes in segmental features which are characteristic of unaccented syllables in colloquial Standard Thai. The term " unaccented " will be used in this and the next chapters in referring to all degrees of [Accent] other than [Accent 1] and [Accent 2]. Certain changes, however, take place in the two very fast styles only, namely the Presto and the Prestissimo styles; and this will be mentioned when one comes to discuss the changes in question. The chapter is divided into two parts : 7.1. deals with changes in segments with the features [-consonantal] ; while 7.2. deals with changes in segments with the features [+consonantal] .

7.1. Segments with the features [+syl, -cons] or "pure vowel " are the followings :

(1)

	[-back]		[+back]	
	[-round]	([+round])	[-round]	[+round]
[+high]	i		ɯ	u
[-high, -low]	e		ɤ	o
[+low]	ɛ		a	ɔ

Segments with the features [-syl, -cons] or the " glides " are the followings :

(2)

(i) All non syllabic vowels.
(ii) /h/ and /ʔ/

The essential difference between (2.i.) and (2.ii) is the fact that all segments in (2.i.) are [+sonorant] while those in (2.ii) are [-sonorant] .

In analysing the syllabic nucleus and the syllabic cluster of unaccented syllables, the following changes are typical of unaccented

syllables in the Allegretto style[1]:

(3) (i) All syllabic vowels are "centralized".[2]

(ii) One of the non-sonorant glides, namely the glottal stop is deleted in certain environments, e.g. /wan\ʔaʔ raj/ "Which day?" is phonetically [wan a laj] [3].

(iii) The high glides /j/,/w/ become nonhigh (or /e/ and/o/) while the low glide /a/ becomes non low /ə/ in diphthongs and triphthongs. /^khaw / "into" is thus phonetically [khao] .

(iv) The syllabic segment with the features $\begin{bmatrix}+\text{low}\\+\text{back}\\-\text{round}\end{bmatrix}$ namely /a/ becomes [-back] or /ɐ/ when it is followed by a [-back] glide(/j/) e.g. /^tchaj ˇmaj /" Isn't it?" is phonetically [tchaj mɛe] .

The notion of the vowels being "centralized" needs some clarification here. By "centralizing", the author does not mean that all the unaccented vowels become the central vowel [ə] as in English; but rather that vowels which are [+high] namely / i u ɯ/ have their degree of height lowered, but not as low as / e ɣ o / which are [-high] ; that vowels which are [+low] namely / ɛ a ɔ / have their degree of lowness raised slightly but not to the same extent as the height of / e ɣ o / which are [-low]; and that vowels which are either [-back] e.g. / i e ɛ/ or [+back] e.g. / u o ɔ ɯ ɣ a / become less [-back] or less [+back] as the case may be. Thus, phonetically one may represent the nine unaccented vowels : / i e ɛ u o ɔ ɯ ɣ a / as $\begin{bmatrix} i & e & ɛ & u & o & ɔ & ɯ & ɣ & a \\ \top\rightarrow & \rightarrow & \perp\rightarrow & \top\leftarrow & \leftarrow & \perp\leftarrow & \top\leftarrow & \leftarrow & \perp\leftarrow \end{bmatrix}$ respectively, with the symbols

⊥ = raised
⊤ = lowered
← = fronted
→ = retracted

How can one then formulate a rule or rules which will capture this centralizing of the syllabic nuclei in unaccented syllables ? One way of treating this phenonmenon is to have a rule which assigns say n degrees of whatever feature [- [high] , [low] , [+back] or [-back] to the accented vowel and then another rule which assigns only n-1 degrees of the feature or features to the unaccented vowels. The author tries to avoid having to postulate such rules because of the complication they involve. For in so doing, one must take into account the degrees of say - [+back]

that already exist among the six [+ back] vowels (see (1) on p. 108); for /o/ is less back than /u/, /ɔ/ is less back than /o / while /a/ is less back than /ɔ/. Moreover, at the phonetic level, one will have to turn the scale of [-back] to the scale of so many degrees of just the feature [back].

An alternative to this is possible if one is allowed to utilize the feature [tense] and assigns the feature [+tense] to the accented vowels and [-tense] to the unaccented vowels. The definition of the feature [tense] has been given in SPE as[4]:

> " Tense sounds are produced with a deliberate, accurate, maximally distinct gesture that involves considerable muscular effort; nontense sounds are produced rapidly and somewhat indistinctly. In tense sounds, both vowels and consonants, the period during which the articulatory organs maintain the appropriate configuration is relatively long, while in nontense sounds the entire gesture is exe-cuted in somewhat superficial manner,...
>
> One of the difference between tense and lax vowels is that the former are exe-cuted with a greater deviation from the neutral or rest position of the vocal tract than the latter. It has been observed, for instance, that the tongue constriction in tense [i] is narrower than that in lax [i] . This difference in tongue height is superficially rather similar to that observed between high [i] and the nonhigh [e] . The mechanism involved, however, is quite different in the two cases...
>
> The greater articulatory effort in the tense vowels is further manifested by their greater distinctiveness and the markedly longer duration during which the articulatory configuration remains stationary."

Although the feature [tense] has been used in the analysis of English to differentiate the long vowel from the short vowel as in the case of /i/ in "seat" and "sit", there seems to be no reason why one may not use it to distinguish the accented vowel from the unaccented vowel in Thai when all the definition and all its articulatory correlates correspond to the situation we have here. Unaccented vowels have the minimum degree

of [length] , namely [length 1] , in comparison with all accented vowels (see length assignment rules on p. 103 in Chapter VI). The muscular effort involved in their production is hardly any in comparison with the corresponding accented vowels. The period during which the articulatory organs maintain the appropriate configura-tion is so short that no steady state is present and all that may be seen on the spectrogram is the vowel-consonant transition or a glide if the vowel is followed by a sonorant glide(see all spectrograms of unaccented vowels in this chapter). The definition of a [-tense] vowel therefore neatly fits all unaccented vowels in Thai.

The author has not used the feature [tense] in her analysis of Thai segments at the phonological level. The "short" and the "long" vowels are treated as being a sihgle vowel and a sequence of two identical vowels respectively. The former then receives [length 3] and the latter [length 5], at the phonetic level, by rule (12) and (10) in Chapter VI (see p. 103). One may therefore state that all vowels in Thai are [+ tense] and have a rule as in (4) which states that all tense vowels, when unaccented , become nontense vowels :

(4)

$$[+\text{tense}] \longrightarrow [-\text{tense}] \; / \; \underset{[\text{unaccented}]}{\overline{V}}$$

The glottal stop . There are 3 environments in the Allegretto style where the glottal stop which is $\begin{bmatrix} -\text{son} \\ -\text{cons} \\ -\text{cont} \end{bmatrix}$ is deleted namely :

(5)

(i) after an unaccented or a [-tense] syllabic segment (i.e. a single vowel), e.g.
/ˋʔaʔˋriʔ /"a rival" is phonetically [ʔa liʔ] .

(ii) before an unaccented syllabic segment and after a nasal, e.g.
/ wanˋʔaʔ rajˊ / " Which day ?" is phonetically [wan a laj] .

(iii) before an unaccented syllabic segment and after a sonorant

glide (i.e. a non-syllabic vowel), e.g.

/^khuu ˋ ʔaʔ ˋriʔ / " rivals " is phonetically [khuu a liʔ].
2 3 1

The presence of the glottal stop in these environments may be deleted by a rule in (6)

(6)

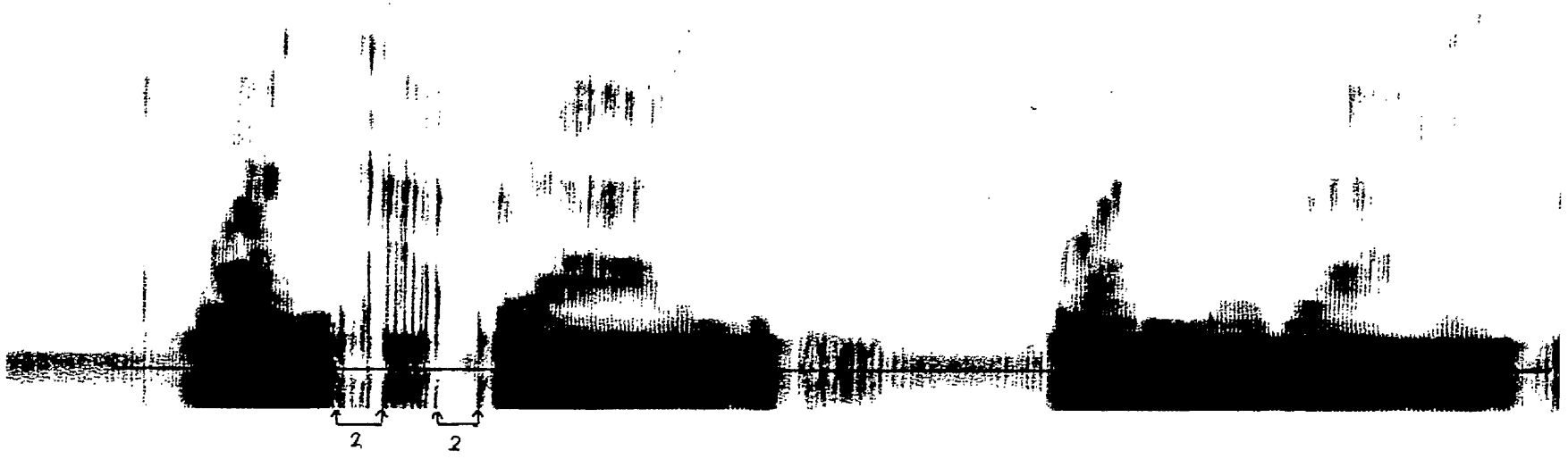
$$\begin{bmatrix} -son \\ -cons \\ -cont \end{bmatrix} \longrightarrow \emptyset \left\{ \begin{array}{ll} \overset{V}{[-tense]} \_\_\_\_\_ & (a) \\ \left\{ \begin{bmatrix} +nasal \end{bmatrix} \right. & (b) \\ \left. \begin{bmatrix} -syl \\ -son \\ -cons \end{bmatrix} \right\} \_\_\_\_\_ \overset{V}{[-tense]} & (c) \end{array} \right.$$

Fig.7.1. on page 113-4 shows the spectrograms of utterances (a) / wanˋʔaʔ raj / and (b) /^khuu ˋʔaʔ ˋriʔ / spoken first in the Largo style when the glottal stops are present as shown by gaps of voicelessness between the arrows ↑ and by spikes which show the release of the stop closure; and then in Allegretto style when the glottal stops are deleted by rules in (6). The glottal stops in the environments in (6) are no longer present in the spectrograms of these utterances in the Allegretto style as indicated by the voiced bar which runs through the places corresponding to the gaps in the Largo style.

There are two types of diphthongs in Thai :(i) those ending with a high sonorant glide which is either /j/ or /w/; and (ii) those ending with a low sonorant glide which is /a/. Both types may occur in unaccented syllables. However, it has been noticed that in these syllables, the glides in question never reach the levels of height such as have been specified in Table 1.1. on p. 14. For on the spectrograms, when unaccented syllables with these diphthongs are spoken in the Allegretto style, if the diphthong ends with /j/, the formant patterns of this glide resemble those of /e/; but never those of /i/ unless the unaccented syllable in question is phrase final. If the diphthong ends with /w/, then it is realized as a non-syllabic /o/ and if it ends with /a/, it is then realized as [ə].

Fig. 7.1.

(a) / 1 wan 3 ʔaʔ 1 raj / " Which day ? "

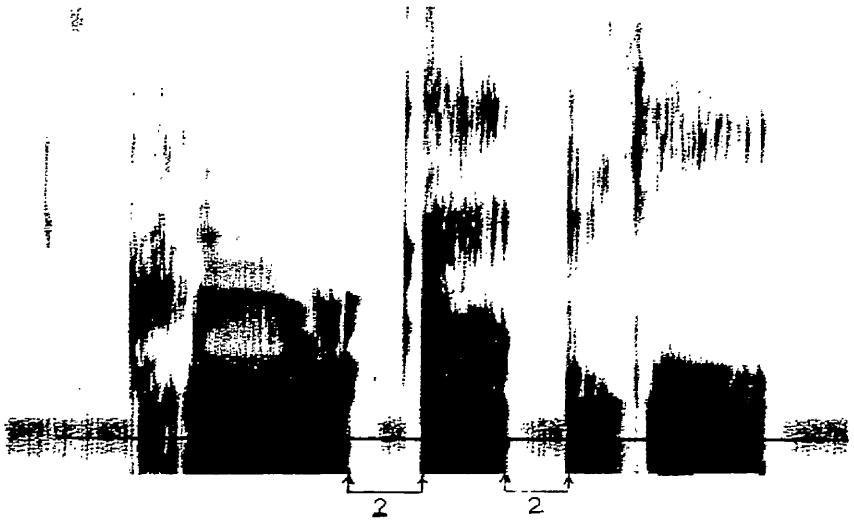


(a_1) Largo : [wanˋʔaʔ laj]

(a_2) Allegretto : [wan a laj]

Fig. 7.1.

(b) /^ $\overset{2}{\text{khuu}}$ `$\overset{3}{\text{ʔaʔ}}$ `$\overset{1}{\text{riʔ}}$ / " rivals "



(b_1) Largo : [khuu ʔaʔ riʔ]

(b_2) Allegretto : [khuu a liʔ]

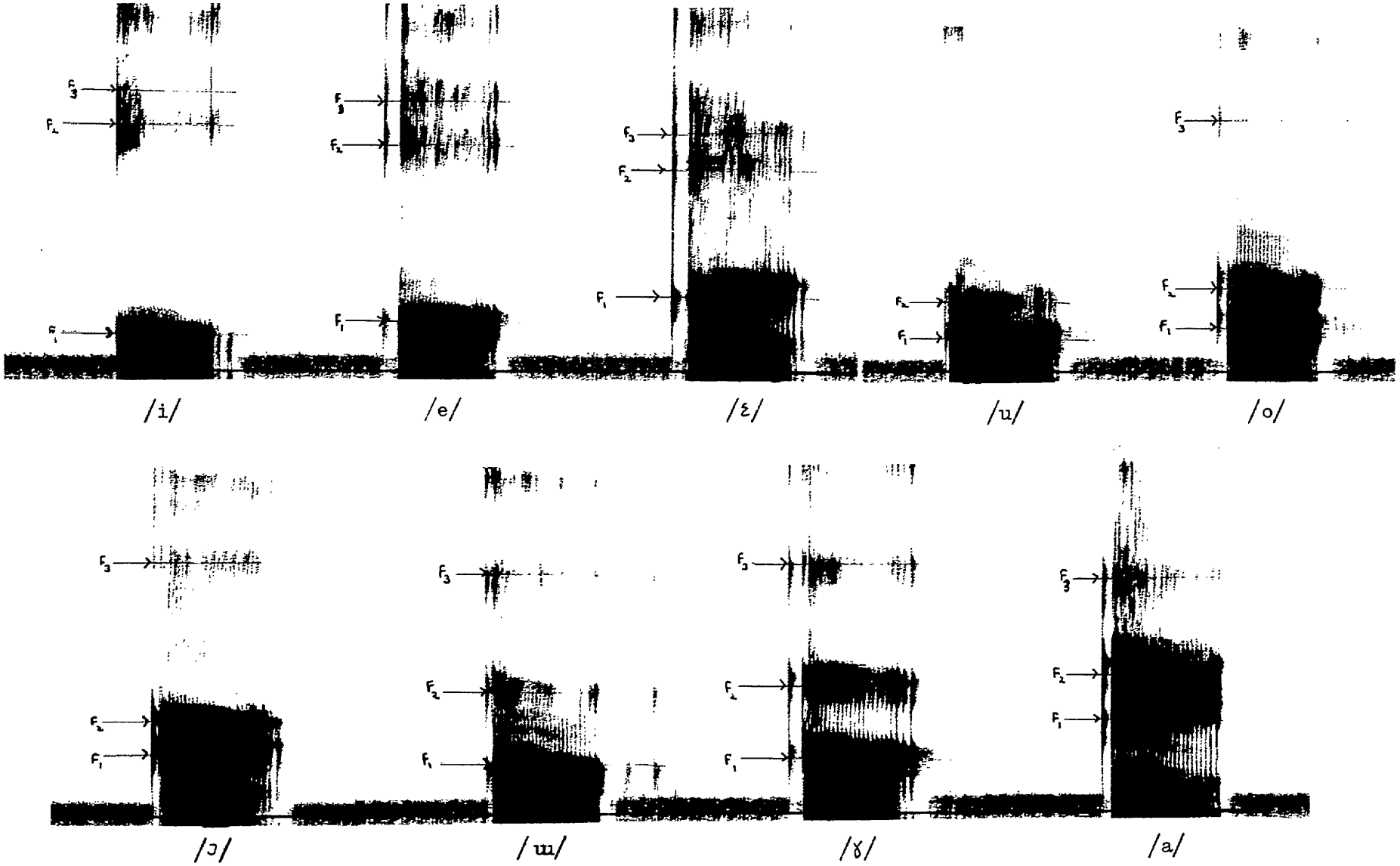
In other words, the high glide of a diphthong in an unaccented syllable is lowered while the low glide of a diphthong in an unaccented syllable is raised. Thus in unaccented syllables, /aj/ is realized as [ae] , /aw/ is realized as [ao] and / ia / is realized as [iə] . To illustrate this point, spectrograms of the nine accented vowels were made; the vowel-consonant transition was eliminated by the use of preceding and following glottal stops, thus ensuring the steady state of the vowel, no matter how short it might be. These spectrograms are shown in Fig.7.2. on p. 116 and the frequency measurements of the lower two or three formants of each vowel are given in TABLE 7.1. below for future comparison.[5] Since the author does not intend to give a detailed acoustic analysis of the data used in this chapter, only some examples and their frequency measurements will be givento illustrate the point. However, it should be pointed out that in the actual analysis, unless at least ten items among those under examination conformed to a convincing degree in their measurements and formant patterns, no statement will be made.[6]

TABLE 7.1.

Frequency Measurements of the Thai Vowels

Vowel	F_1	F_2	F_3
/i/	500	3100	3700
/e/	650	2800	3500
/ɛ/	900	2600	2950
/u/	460	880	-
/o/	520	1000	3150
/ɔ/	770	1180	3200
/ɯ/	680	1520	3000
/ɤ/	700	1600	3080
/a/	1080	1700	2850

Fig. 7.2. Thai Accented Vowels.



To come back to the point mentioned earlier that the high sonorant glides /w/ and /j/ are lowered while the low sonorant glide /a/ is raised in diphthongs of the unaccented syllables, spectrograms of the utterances /^maj ^maj / " (It) isn't burnt." and /ˇkh»ŋ `kaw `kaw ^khaʔ / " It is very ancient." were made as shown on Fig. 7.3. on p. 118. The first spectrogram shows the formant patterns of unaccented and accented / aj / while the second spectrogram shows the formant patterns of unaccented and accented / aw / respectively. For comparison, measurements were made of the first two or three formants of the two high glides in question in both unaccented and accented syllables. The points of measurements are indicated by the horizontal arrows on the spectrograms. The frequencies of these two or three formants are given in (7)

(7)

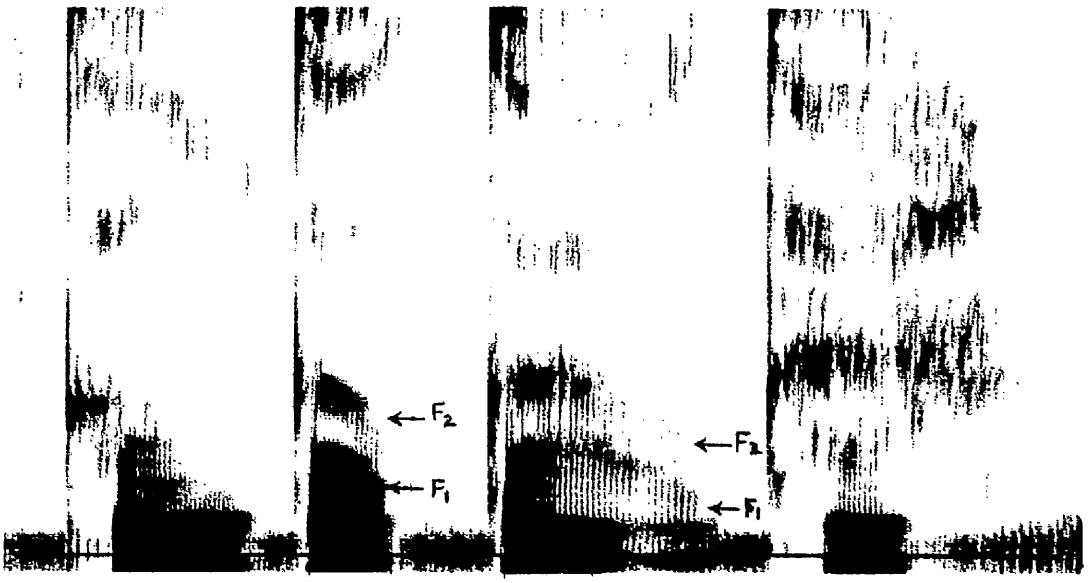
	/ j /		/w /	
	unaccented	Accented	unaccented	accented
F_1	625	400	650	450
F_2	2450	2850	1250	1000
F_3	3150	3650		

measurements in c.p.s.

By comparing these measurements with the frequencies measurements of Thai vowels in TABLE 7.1. on p. 115 , it seems that the formants of /j/ and /w/ in unaccented syllables correspond most closely to the formants of /e/ and /o/ respectively. The slight difference may be explained by the fact that the measurements on TABLE 7.1. are those of accented vowels which are [+tense] while /j/ and /w/ in Fig. 7.3. occur in unaccented syllables. Although no spectrogram of unaccented syllables with a diphthong ending in /a / has been given, one may compare the three formants of / a / in unaccented / m uan / in Fig. 7.11. on p. 138 with the three formants of the accented / a/ in TABLE 7.1. on p. 115. The comparison is given in (8) and those of / / showing the change in the formant pattern of /a/ in / m uan / :

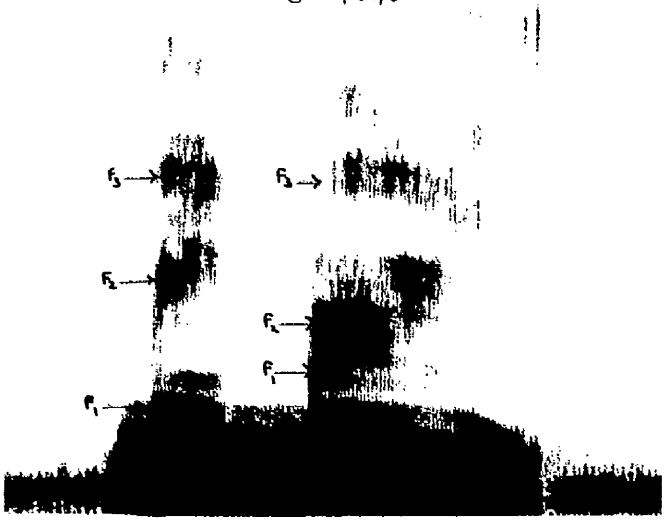
Fig. 7.3.

3 1
(a) / ^maj ^maj / " (It) isn't burnt."



3 1
(b) /^khɔɔn `kaw `kaw ^kha? / " It is very ancient."

Fig. 7.4.



3 1
(a) / ^maj ^maj / "a bit burnt."

(8)

	/a/		/ɣ/
	unaccented	accented.	accented
F_1	650	1080	700
F_2	1300	1700	1600
F_3	2850	2850	3080

in c.p.s.

It seems that from the evidence given above, one is justified to have rules as in (9) and (10) below :

(9)

$$[+\text{high}] \longrightarrow [-\text{high}] \; / \; \underset{[-\text{tense}]}{V} \; \_\_\_\_$$

(10)

$$[+\text{low}] \longrightarrow [-\text{low}] / \; \underset{[-\text{tense}]}{V} \; \_\_\_\_$$

(9) and (10) state that segments which are [+high] become [-high] while segments whinh are [+low] become [-low] if any them immediately follows a nontense vowel . Since we represent thc nonsyllabic vowels /i/ and /u / in diphthongs by the symbols /j/ and /w/ respectively, we will consistently represent the nonsyllabic /a/ in diphthongs by the symbol /ə/. This representation of the glide /a/ in unaccented syllables by the symbol ə is well supported by the acoustic analyses in (8) where it is shown that /ə/ is a nontense /ɣ/. (9) and (10) therefore give the instructions that /j/, /w/ and /ə/ are to be realized as [e] [o] and [ə] respectively in these environments.

Changes have been observed in a syllabic nucleus with the features $\begin{bmatrix} +\text{low} \\ *\text{back} \\ -\text{round} \end{bmatrix}$, namely /a/ when this segment is followed by /j/ and occurs in unaccented syllables. The change which takes place is that /a/ which is [+back] becomes [-back] or [ɐ] in this environment as illustrated by the spectrogram of the utterance /^maj ^maj / " a bit burnt " shown in Fig . 7.4. on p. 118 . Frequencies measurements of the first three

formants of /a/ in unaccented /^maj/, and in accented /^maj / are given in (11) in contrast with the first three formants of /ɛ/ taken form TABLE 7.1. on p. 115.

(11)

	/a/		/ɛ/
	unaccented	accented	accented
F_1	800	1200	900
F2	2050	1700	2600
F_3	3000	3000	2950

in c.p.s.

It seems that the three formants of /a/ in unaccented /^maj / come nearer to the three formants of /ɛ/ rather than /a/. One may state this change by a rule in (12)

(12)

$$[+\text{back}] \longrightarrow [-\text{back}] \,/\, \begin{bmatrix} -\text{tense} \\ -\text{round} \\ +\text{low} \end{bmatrix} \_\_ [-\text{back}]$$

(12) gives the instruction that /a/ is to be realized as / ɛ/ when it is followed by /j / (which is phenetically [e] by the rule in (9)) when their combination occurs as a diphthong in an unaccented syllable. Thus, the phonetic representation of /^ maj^ maj / is [mɛe maj]

7.2. Changes in segments with the features $\begin{bmatrix} -\text{syllabic} \\ +\text{consonantal} \end{bmatrix}$.

Standard Thai has two liquids ; /l/ and /r/. Their status in the language has been described by Abramson[7] as follows :

> " The phonemic status of the [l] and [r] phones is problematic.... One could say that there is a phoneme /l/ with the allophonic range that is rather wide to the western ear. It may be realized as any of a number of phonetically related sounds ranging from a lateral [l] at one extreme . . through a continuum of variants of a trilled apical [r] at the other extreme. Two intermediate points are retroflex [ɽ] and the flap [ɾ]. [l] is the most favoured allophone in all

environments except after /t/, where the most likely articulation is [ɾ] or [r] ....

Taking all the social and linguistic facts into account, one would probably be safest in accepting the presence of /l/ and /r/ in the system,.... while noting the unstable nature of this opposition and the probability of its being in a state of flux."

The author has followed Abramson's treatment of the two liquids, in recognizing them as two separate segments which are distinctive from each other by the following features :

(13) $/l/ = \begin{bmatrix} +\text{lateral} \\ -\text{continuant} \\ +\text{anterior} \end{bmatrix}$ $/r/ = \begin{bmatrix} -\text{lateral} \\ +\text{continuant} \\ -\text{anterior} \end{bmatrix}$

However, since in the majority of speakers of colloquial style, this opposition no longer exists, it seems justified to have rules as in (14)

(14)
$$\begin{bmatrix} +\text{son} \\ +\text{cor} \\ -\text{nasal} \end{bmatrix} \longrightarrow \begin{cases} \begin{bmatrix} -\text{lat} \\ +\text{cont} \end{bmatrix} \Big/ \begin{bmatrix} -\text{cont} \\ -\text{nasal} \\ +\text{cor} \\ +\text{ant} \\ -\text{asp} \\ -\text{voiced} \end{bmatrix} \text{———} & \text{(a)} \\ \text{in colloquial style} \\ \begin{bmatrix} +\text{lat} \\ -\text{cont} \\ +\text{ant} \end{bmatrix} \Big/ \text{elsewhere} & \text{(b)} \end{cases}$$

(14) states that the liquid in colloquial Thai is realized as [l] everywhere-else except after /t/, where it is realized as [r] (/l/does not occur in this position).

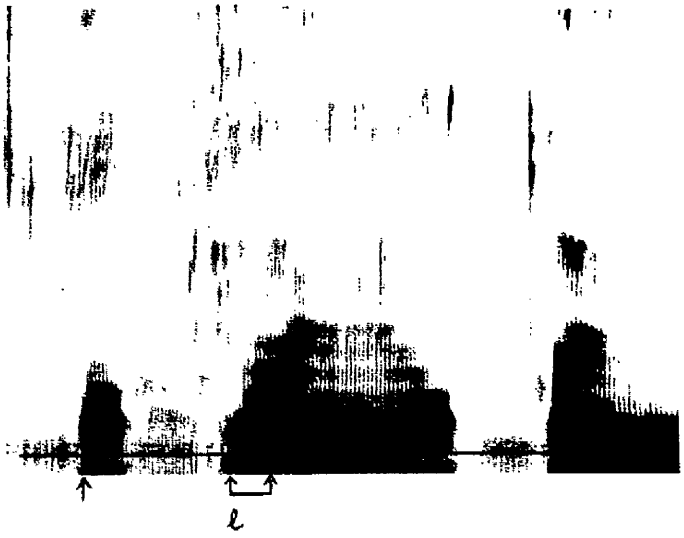
It is doubtful that the speakers who make the distinction between /l/ and /r/ would use a style any faster than Andante; their speech, therefore, does not come under our study. (14) is treated as obligatory in the colloquial style.

The behaviour of the liquids with regard to accent is that they are deleted if they occur before a syllabic segment in unaccented syllables in certain environments. This deletion may be described by rules in (15)

(15)
$$\begin{bmatrix} \alpha\,\text{lat} \\ +\text{son} \\ +\text{cons} \\ -\text{nasal} \end{bmatrix} \longrightarrow \emptyset \Big/ \begin{cases} \text{C} \quad \begin{bmatrix} -\alpha\,\text{cont} \\ \alpha\,\text{ant} \end{bmatrix} \quad \text{V} \quad [-\text{tense}] & \text{(a)} \\ \begin{bmatrix} -\text{syl} \\ -\text{cons} \\ +\text{son} \end{bmatrix} \quad \begin{bmatrix} -\alpha\,\text{cont} \\ \alpha\,\text{ant} \end{bmatrix} \quad \text{V} \quad [-\text{tense}] & \text{(b)} \end{cases}$$

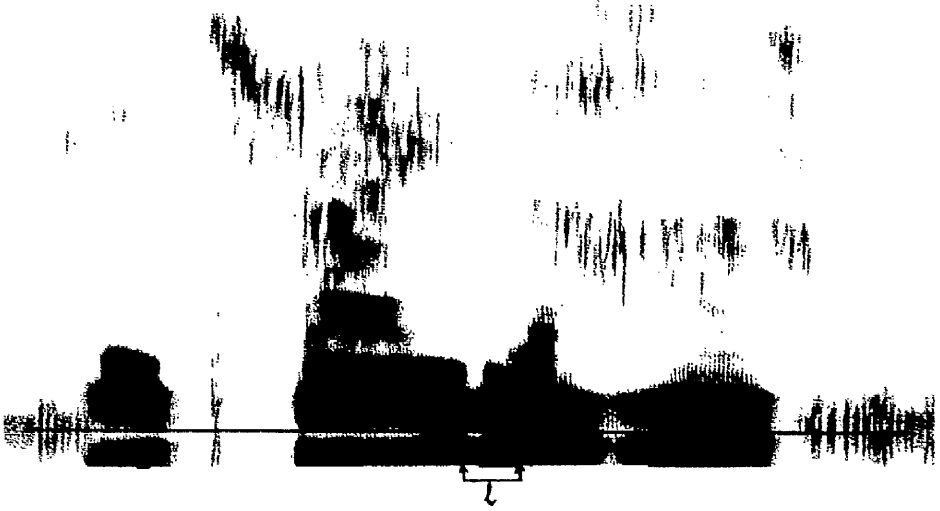
(15) states that the liquid is deleted when (a) it is a part of the consonant cluster

(a) /ˈkhlaaj ˈkhlaaj kan / " (It is) fairly similar."

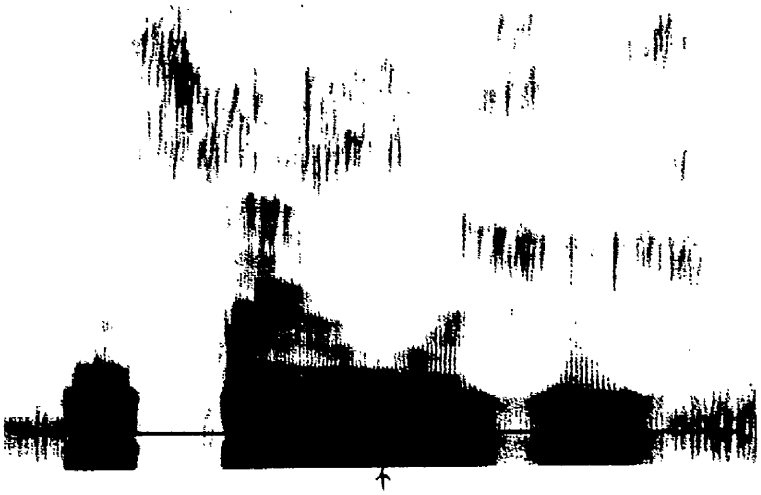


(a) Allegretto : [khɛɛ khlaaj kan]

(b) / ^maj ^tchaj ^la? ^ha? / " It isn't that."



(b_1) Andante : [maj tchaj la ha]



(b_2) Allegretto : [mɛɛ tchaj a ha]

which precedes an unaccented (or nontense) vowel and (b) when it occurs after a sonorant glide and before an unaccented vowel. Examples :

(16)

lexical representations	Phonetic representations
/´khlaaj ´khlaaj kan /" fairly similar"	[khɛe khlaaj kan]
/^maj ^tchaj ^la?^ha? / "It isn't that."	[mɛe tchaj a ha]
/ˇloo ´la?^thaw raj / "How much per dozen?"	[loo a thao laj]

Spectrograms of the utterances /^{3}´khlaaj ^{1}´khlaaj ^{3}kan / and /^{3}^maj ^{1}^tchaj ^{3}^la?^{3}^ha?/ are shown in Fig. 7.5. on p. 122 . In Fig. 7.5(a), /l/ in the unaccented /´khlaaj / has been deleted as indicated by the absence of the resonance formants which are present, (shown between a double vertical arrows) in /^{1}´khlaaj/, immediately before the starting points for the formants of the vowels /aa/ . Fig.7.5(b_1) and (b_2) contrast the utterance /^maj ^tchaj ^la? ^ha? / first spoken in Andante and then in Allegretto . In the Andante style, the presence of /l/ in / ^la? / is indicated by the partial voicing before the vowel on the one hand, and by the resonance formants of /l/ on the other, as indicated by the double vertical arrows and the horizontal arrow respectively. In the Allegretto style, in the corresponding places, the voicing is not partial, but complete; while the vowel transition is from /j/ to /a/ without the presence of the /l/ resonance formants.

There are two environments where /l/ changes its features. For instance, /^{3}^maj ^{1}phɛɛŋ ^{3}^la? ^{3}^ha? / "It isn't expensive." is phonetically [mɛe phɛɛŋ a ha] while /^{1}`tok ^{3}loŋ ^{3}maa / " It fell down." is phonetically [tok noŋ maa] . But since these changes come under the same rules which apply equally to other segments with the features [-aspirated, -continuant], these changes are referred to in (24) below.

It has been observed in the Allegretto styles as well as other faster styles that when two identical consonants occur one after the other with an unaccented vowel preceding and/or following them, one of the

Fig. 7.6.

1 1
(a) / khon naan/ " to stir for a long time."

3 1
(b) / man naan / " It took a long time ."

consonants is deleted. Thus, / kamma? ˋjii / " velvet " is phonetically [kam a jii] , / man naan / " It takes a long time." is [manaan] while / ˇphom maa / " I came." is [phomaa]. This deletion may be illustrated by the spectrograms of the utterances / khon naan /" To stir for a long time" in Fig. 7.6(a) on p. 124 ,where /n/ has not been deleted in comparison with Fig. 7.6(b)/ man naan / " It took a long time." where one of the /n/'s has been deleted as indicated by the duration of /n/ in Fig.7.6(a) which is 1.95 centiseconds and the duration of /n/ in Fig. 7.6(b) which is 1.20 centiseconds. This evidence seems to support a rule in (17)

(17)

C ⟶ ∅ / _____ identical C with adjacent nontense vowel(s).

In Allegretto and the faster style - Presto, the unaccented vowel which is followed by one of the nasals is nasalized. An illustration of this is shown in Fig.7.6(b) on p. 124. In the syllable / man/ "it" , the bar which indicates the nasal resonance runs through the whole syllable. This nasalization of the unaccented vowel in this environment entails further changes in features of the segment which precedes it in the Presto and Prestissimo styles as will be seen below . The rule for this nasalization may be stated in (18)

(18)

$$\begin{bmatrix}\text{segment}\\ +\text{syl}\\ -\text{tense}\end{bmatrix} \longrightarrow [+\text{nasal}] / \_\_\_\_\_ [+\text{nasal}]$$

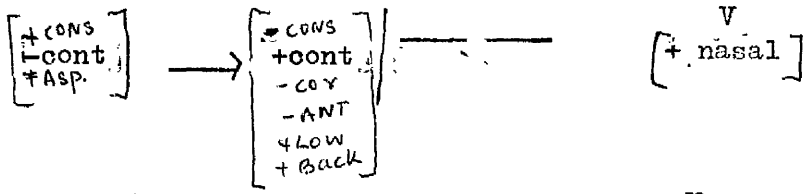
Further changes in the features of the segment preceding the nasalized vowel in the Presto style may be described as follows :

If the segment in question has among its features, the features $\begin{bmatrix}+\text{aspirated}\\ -\text{continuant}\end{bmatrix}$ (that is to say the aspirated stops /ph th kh/ and the aspirated affricate / tch /), then the aspirated fricative which is /h/ will be used in its place.

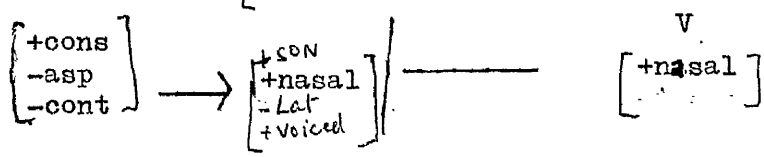
If the segment in question has among its features, the features $\begin{bmatrix}-\text{aspirated}\\ -\text{continuant}\end{bmatrix}$, then the nasal which share most of its other

features will be used in its place. One should be reminded that in both cases, the segment in question must also have the feature [+consonantal]. Rules in (19) and (20) below which describe these changes do not therefore apply to /j w ʔ / which also occur in the same environment.

(19)



(20)



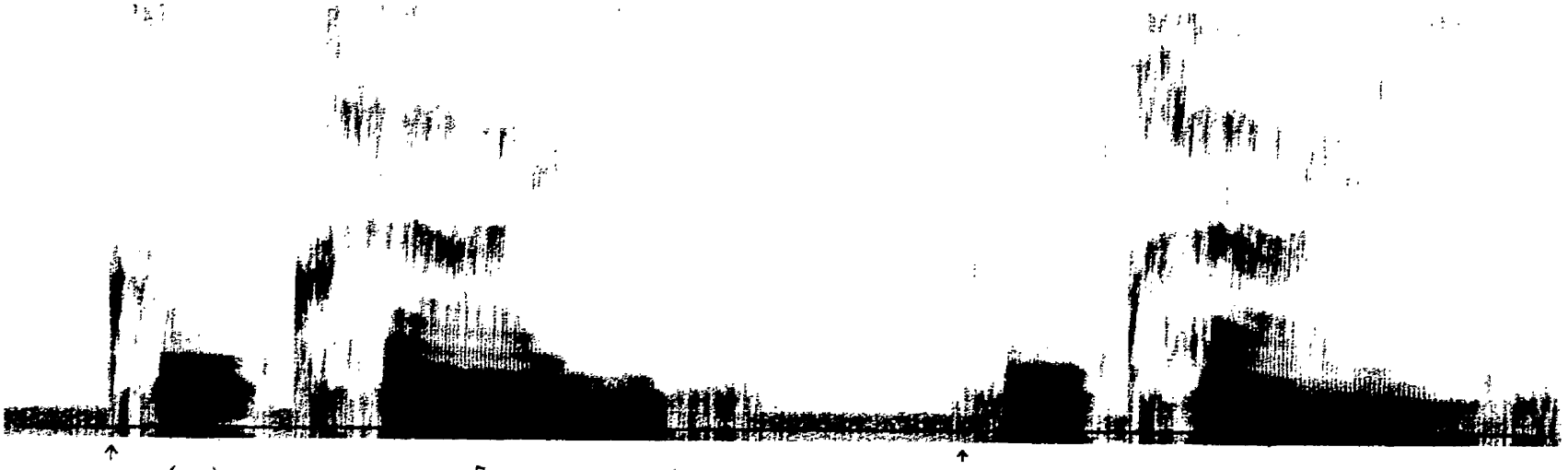
The fricatives /s f/ are not subject to rule (20) since they are [+cont] . /tc/ and /l/ however, having all the features required for the operation of rule (20), are subject to this change. The nasal which corresponds with /tc/ featurewise is the palatal nasal [ɲ] which is [+coronal, -anterior] which are also features for / tc/ (see TABLE 1.1. on p. 14) . The nasal corresponding to /l/ is the alveolar [n], both sharing the features [+cor, +ant] . Examples of utterances containing lexical items subject to rules in (19) and (20) are given in (21) in their lexical and phonetic representations.

(21)

Lexical representations		Phonetic representations (Presto)
/ˇkhɔɔ ŋ khraj /	"Whose?"	[hɔŋ khlaj]
/ˋdiʔ ˇtchan /	" I,(female)"	[di han]
/thaŋ ˊnan /	" In most cases"	[haŋ nan]
/khlaaj ˊkhlaaj/	" fairly similar"	[hɛe khlaaj]
/ˆphruŋ ˊnii /	" Tomorrow"	[huŋ nii]
/klaaŋ wan /	" daytime"	[ŋaŋ wan]
/ kruŋ ˆtheep/	" Bangkok"	[ŋuŋ theep]
/ tciŋ tciŋ ˆ khaʔ /	"Honestly!"	[ŋiŋ tciŋ kha]
/ˇkhɔɔ ˆ baaŋ /	"Can I have some?"	[khɔɔ maŋ]
/ˋtok loŋ maa /	" fell down"	[tok noŋ maa]
/ tham tcon taaj /	" work to death"	[tham ɲon taaj]

Fig. 7.7.

(a) /ˇkhɔɔŋ khraj / " Whose ? "



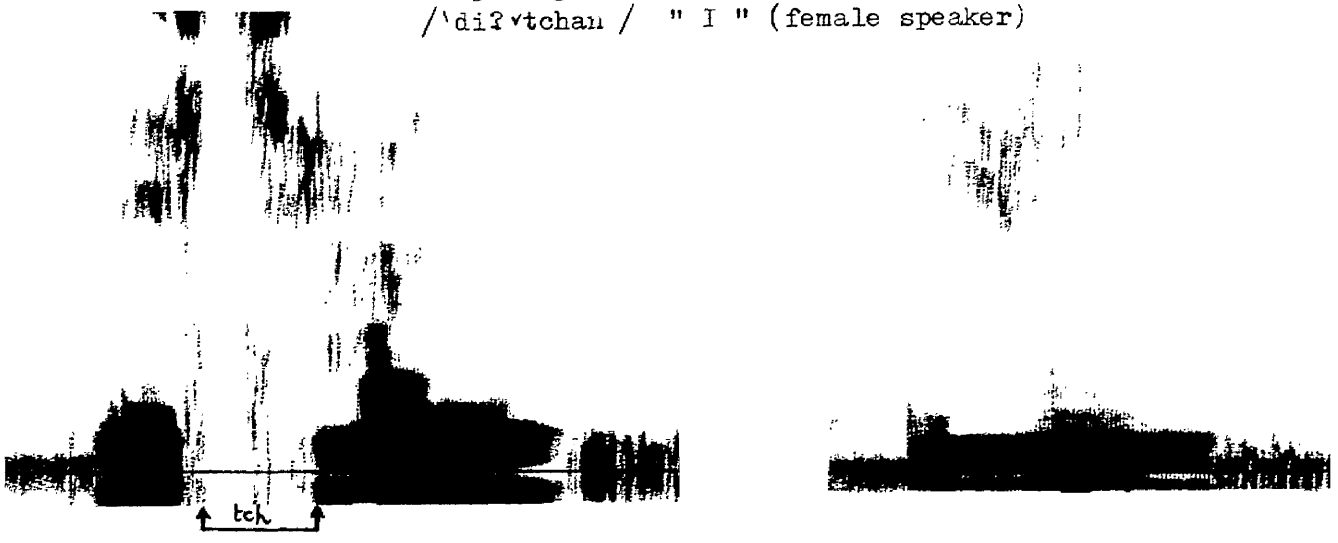
(a_1) Allegretto : [khɔŋ khlaj]

(a_2) Presto : [hɔŋ khlaj]

/ˈdi?ˇtchan / " I " (female speaker)

Fig. 7.7.

(b)



(b_1) Allegretto : [di tchan]

(b_2) Presto : [di ɲan]

To illustrate the changes which take place in the Presto style as stated by rule (19), spectrograms of the utterances /ᵛkhɔɔŋ khraj / "whose?" and /diʔᵛtchan / "I, (Female)", first spoken in the Allegretto style and then in the Presto style, were made as shown in Fig. 7.7. on p. 127 . The presence of the initial stop in the syllable /ᵛkhɔɔŋ/ in Fig 7.7(a_1) and in the syllable /ᵛtchan/ in Fig. 7.7(b_1) is clearly obvious as shown by the spikes (indicated by ↑) which indicate the release of the stop closure. The spikes are absent in the corresponding places in Fig.7.7 (a_2 and b_2). All that is visible is the fill which indicates the frictional modulation of the fricative /h/.

Illustrations of the changes which take place in the Presto style as stated by rule (20) are shown in Fig 7. 8 on p. 129. Spectrograms of the utterances / klaaŋ wan / "daytime" and / tciŋ tciŋ ˆkhaʔ/ " Honestly!" first spoken in the Allegretto style and then in the Presto style were made. The presence of the stop and the affricate in the syllables / klaaŋ/in Fig.7.8(a_1) and / tciŋ / in Fig.7.8(b_1) are indicated by the spikes marked by ↑ . The spikes are absent in the Presto style, at the corresponding place, and in their stead, there are a voicing bar and a nasal bar which establish the presence of a nasal segment in their place.

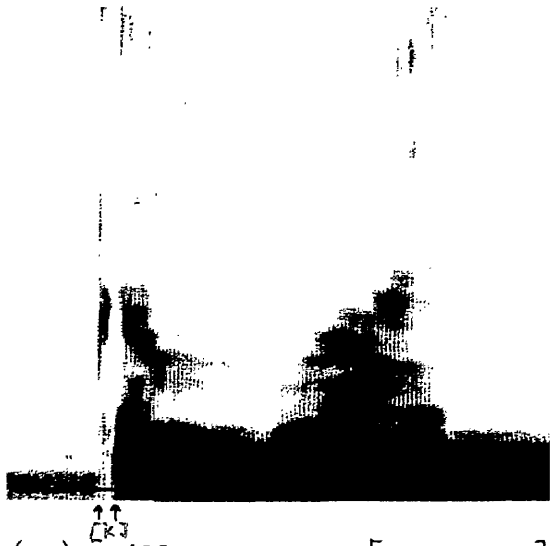
There is another environment in which segments with the features $\begin{bmatrix}-\text{nasal}\\+\text{cons}\\-\text{asp}\\-\text{cont}\end{bmatrix}$ change their feature into [+nasal]. The environment in question is between a segment with the feature [+nasal] and a nontense vowel. For examples :

(22)

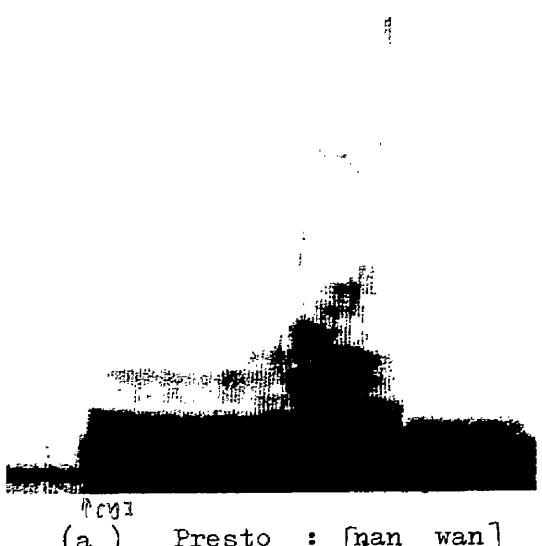
Lexical representations	Phonetic representations
/ˋtaaŋ ˋ kap ᵛkhaw / " It is different from his."	[taaŋ ap khaw]
/ tham tɕon taaj / " work to death."	[tham ɲon taaj]
/ˆmaj phɛɛŋ ˆlaʔ ˆhaʔ / "It isn't expensive."	[mɛɛ phɛɛŋ na ha]

Fig. 7.8.

(a) / 3 klaaŋ 1 wan / " daytime /

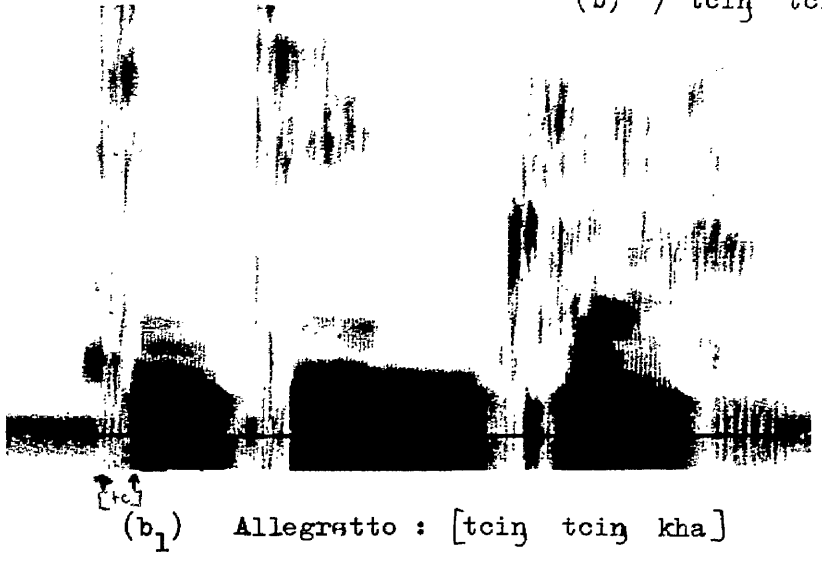


(a$_1$) Allegretto : [kˑaŋ wan]

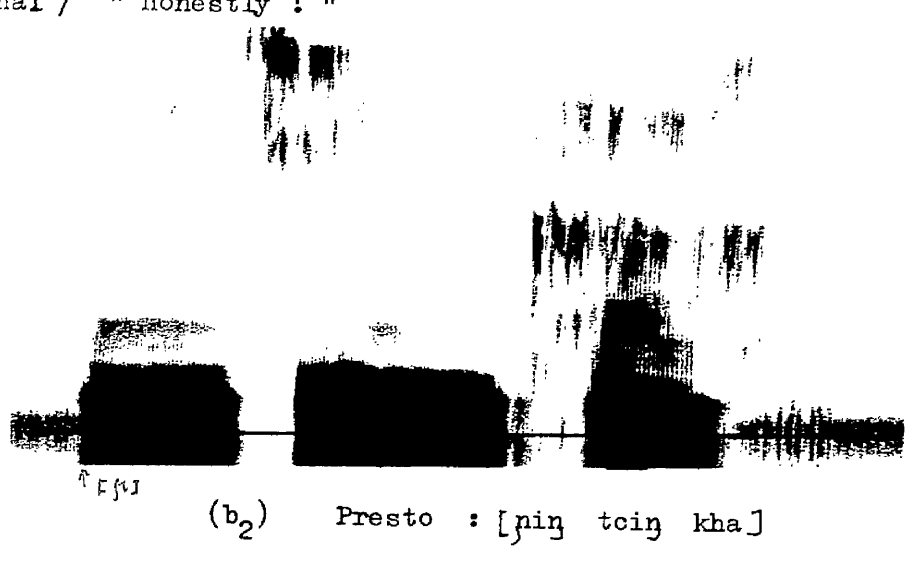


(a$_2$) Presto : [ŋaŋ wan]

(b) / 3 tciŋ 1 tciŋ ^ 3 khaʔ / " Honestly ! "



(b$_1$) Allegretto : [tciŋ tciŋ kha]



(b$_2$) Presto : [ɲiŋ tciŋ kha]

Lexical representations		Phonetic representations.
/ khoŋ ˋtcaʔ maa /	"(He) may come."	[khoŋ ɲa maa]
/ kin ˇbaʔ ˋmii /	" eating noodles"	[kin ma mii]
/ kin ^tanŋ naan/	" take a long time to eat."	[kinannaan]

Illustrations of these changes are shown in Fig.7.9. on p. 131-p. 133 where one may compare spectrograms of the following utterances :

/^taaŋˋ kap ˇkhaw / " It is different from his."

/ tham tcon taaj / " work to death"

/^maj phɯŋ ^laʔ ^haʔ / "It isn't expensive."

which are first spoken in the Allegretto style and then in the Presto style when the changes mentioned above take place. In Fig 7.9 (a_1 -b_1) the presence of the initial stop in the syllable /ˋkap/ and the affricate /tc/ in / tcon/ is indicated by the spike in each figure. The spikes are absent in the corresponding figs a_2 and b_2 and in their stead, one finds the nasal bar. Fig. c_1 and c_2 on p. 133 illustrate the change from /l/ in the pre- nontense syllabic position to a nasal. The presence of /l/ in the syllable /^laʔ / in the Allegretto style (in Fig.7.9(c_1) is indicated by the formants of /l/(indicated by ↑↑) which start before the formants of the following vowel /a/ on the one hand, and by the partial voicing which is typical of all initial voiced segments on the other. Both the /l/ formants and the partial voicing are absent in the corresponding places in the contrasting Fig. 7.9(c_2).

The data above support the rule in (23) below:

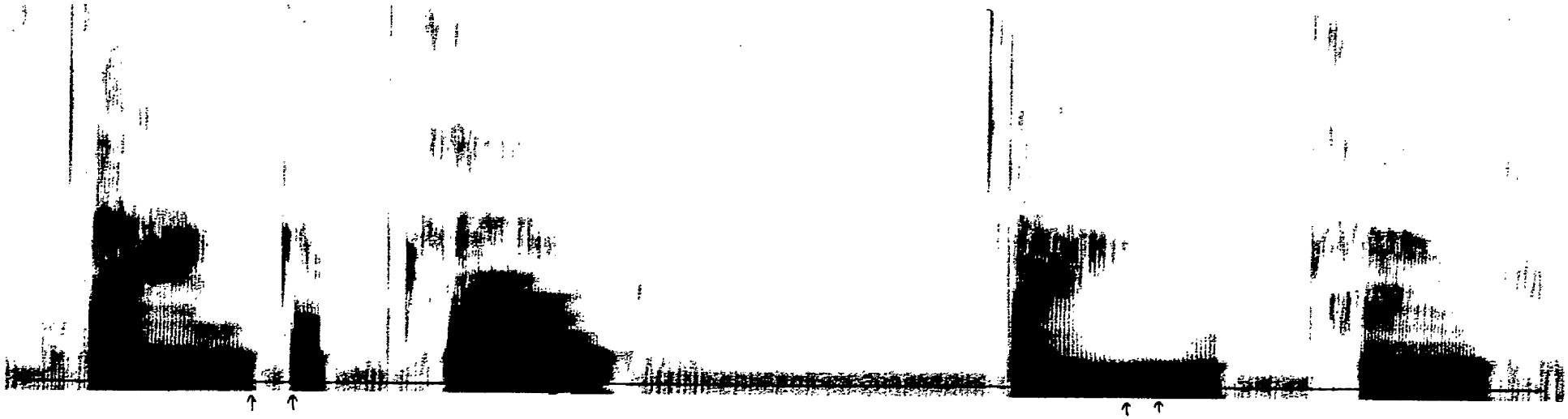
(23)

$$\begin{bmatrix}+\text{cons}\\-\text{asp}\\-\text{cont}\end{bmatrix} \longrightarrow [+\text{nasal}] / [+\text{nasal}] \_\_\_\_ \begin{matrix} \text{V} \\ [-\text{tense}] \end{matrix}$$

(23) states that a segment which is $\begin{bmatrix}+\text{cons}\\-\text{nasal}\\-\text{asp}\\-\text{cont}\end{bmatrix}$ becomes nasalized if it occurs before an unaccented vowel and immediately after a nasal segment. However, the input and the output of rule (23) is identical with those in rule (20)

Fig. 7.9

(a) / ˋtaaŋ ˋkap ˇkhaw / " It is different from his."
1 3 3

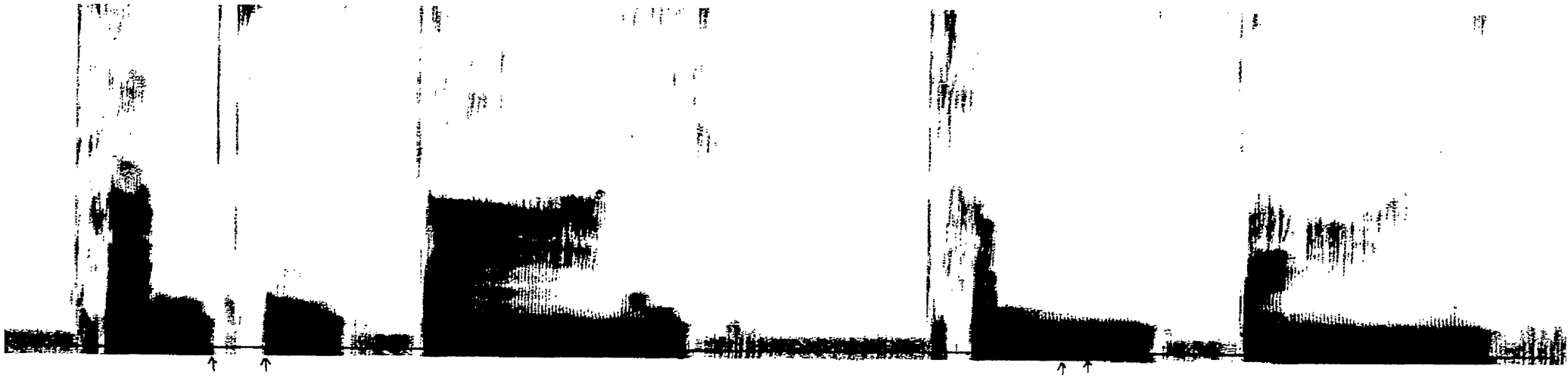


(a_1) Allegretto : [taaŋ kap khaw]

(a_2) Presto : [taaŋ ap khaw]

Fig. 7.9b

(b) / 1 tham 3 tcon 1 taaj / " work to death "

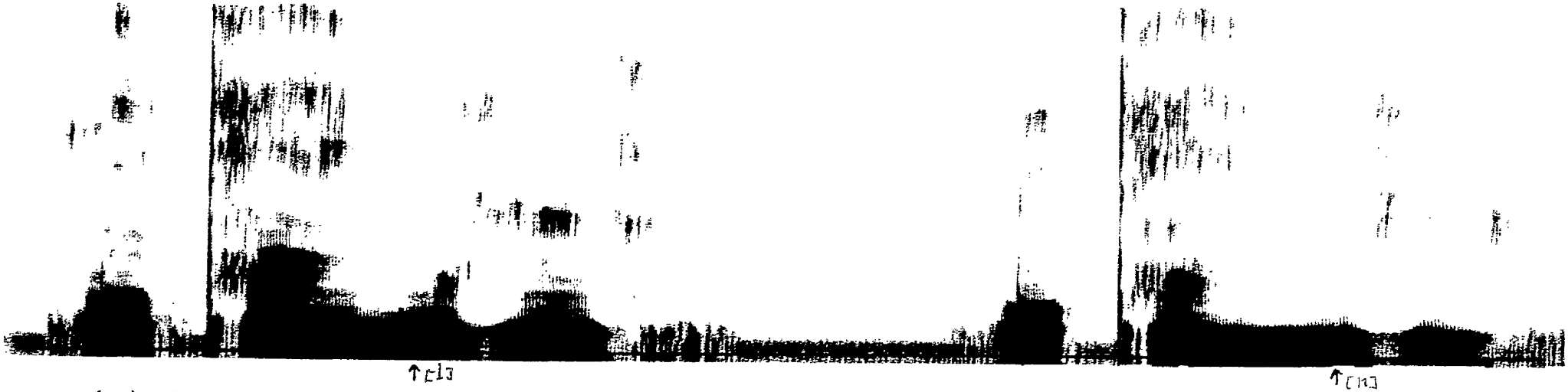


(b_1) Allegretto : [tham tcon taaj]

(b_2) Presto : [tham ɲon taaj]

Fig. 7.9c

(c) / 3 maj 1 phɛɛŋ 3 la? 3 ha? / " It isn't expensive."



(c_1) Allegretto : [mɛe phɛɛŋ la ha]

(c_2) Presto : [mɛe phɛɛŋ na ha]

on p. 126. One may therefore conflate (20) and (23) into (24) below :

(24)

$$\begin{bmatrix}+\text{cons}\\-\text{asp}\\-\text{cont}\end{bmatrix} \longrightarrow [+\text{nasal}] \Big/ \begin{cases} \underline{\quad} \begin{bmatrix}\overset{V}{-\text{tense}}\\+\text{nasal}\end{bmatrix} & \text{(a)} \\ [+\text{nasal}] \underline{\quad} [\overset{V}{-\text{tense}}] & \text{(b)} \end{cases}$$

Earlier on p. 9, we mentioned the faster style than the Presto namely the Prestissimo style. The basic difference between the two styles lies in (i) the loss of the syllabic nucleus in certain type of syllable on the one hand, and on the other hand, (ii) in the transfer of the feature [+syllabic] from one segment to another following by the deletion of that segment, in another type of syllable. For it has been observed that in the Prestissimo style, an unaccented syllable with a single vowel which is not followed by a stop or a nasal, is lost whenever this syllable occurs immediately after another unaccented syllable which does not end with a nasal or a stop. Thus, /ˊmiʔ ˋthuʔ naa / "June", is phonetically [miwnaa] in the Prestissimo style. What seems to have happened in the loss of this type of syllable is;the initial consonant in this syllable is first deleted; then the syllabic segment in the same syllable loses its syllibicity, becoming a glide. If this glide is [-high](namely all glides other than /j/ and /w/, it is deleted. If the glide is [+ high] , it is assilmilated with the preceding syllable. The changes which take place may be described by the following two rules :

(25)

$$\text{segment} \longrightarrow \emptyset \Big/ \begin{matrix}\overset{V}{[-\text{tense}]}\end{matrix} \begin{bmatrix}+\text{son}\\-\text{nasal}\end{bmatrix} \underline{\quad} \begin{matrix}\overset{V}{[-\text{tense}]}\end{matrix} \begin{bmatrix}+\text{son}\\-\text{nasal}\end{bmatrix}$$

(26)

$$\begin{matrix}\text{segment}\\[+\text{syl}]\end{matrix} \longrightarrow \begin{cases} \emptyset \Big/ \begin{matrix}\overset{V}{[-\text{tense}]}\end{matrix} \begin{bmatrix}+\text{son}\\-\text{nasal}\end{bmatrix} \underline{\quad} \begin{bmatrix}+\text{son}\\-\text{nasal}\end{bmatrix} & \text{(a)} \\ [-\text{syl}] \Big/ \begin{matrix}\overset{V}{[-\text{tense}]}\end{matrix} \begin{bmatrix}+\text{son}\\-\text{nasal}\end{bmatrix} \underline{\quad} \begin{bmatrix}+\text{son}\\-\text{nasal}\end{bmatrix} & \text{(b)} \end{cases}$$

(25) and (26) are ordered. The initial consonant is this type of syllable is therefore deleted first before the vowel in the same syllable is either deleted if it is [-high], or becomes nonsyllabic if it is [+high]. It should be noted here that any change in the Prestissimo style will take place after all the relevant rules in the Allegretto and the Presto styles have operated. The glottal stop which, in the lexical entries, may occur after the vowels in rule (25) and (26), would therefore, have been deleted by rule (6a)(see p. 112). Examples of this type of change in the Prestissimo style are given in (27) in the phonological representations of the utterance and its phonetic representaions in the Allegretto, Presto and Prestissimo styles respectively.

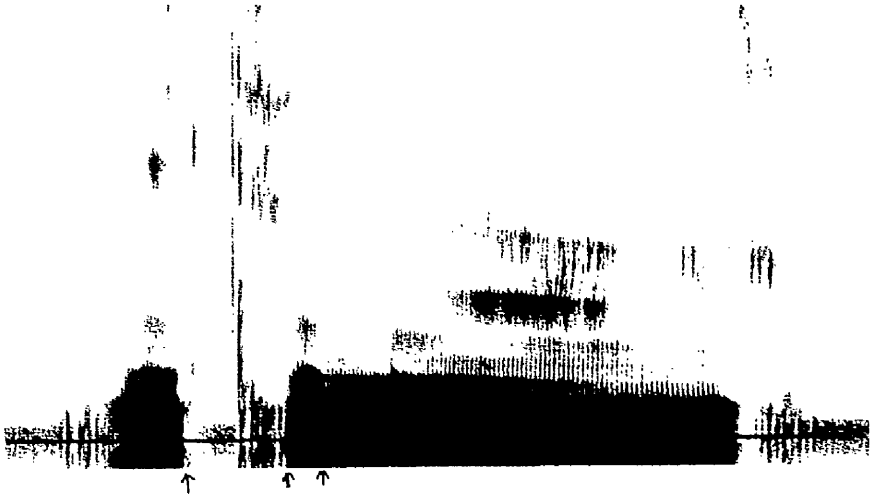
(27)

Phonological rep.	Allegretto	Presto	Prestissimo
/ˊmiʔ ˋthuʔ naa/ "June"	[mi thu naa]	[mi hu naa]	[miw naa]
/ naa ˊliʔ kaa/ " A clock"	[na li kaa]	[na li kaa]	[naj kaa]
/ˊwiʔjaʔ daa*/ " a girl's name"	[wi ja daa]	[wi ja daa]	[wij daa]
/ˆmajˋʔaʔˋrɔɔj/ " It has no taste."	[mɛe a lɔɔj]	[mɛe a lɔɔj]	[mɛe lɔɔj]

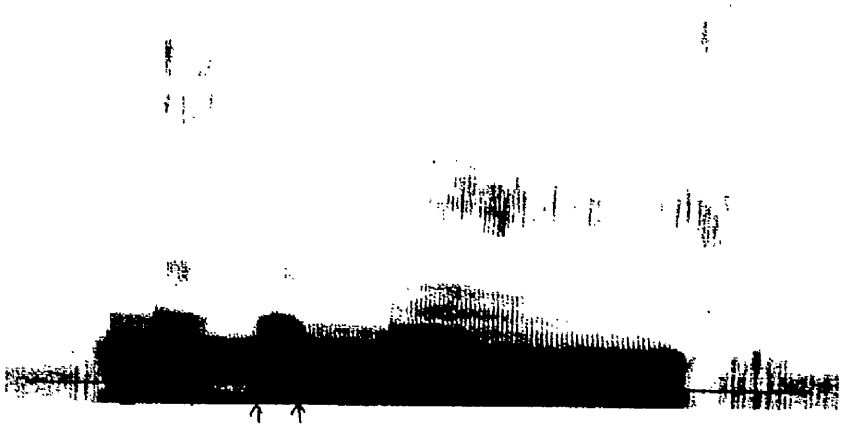
For illustrations of this change, spectrogams of the utterance /ˊmiʔ ˋthuʔ naa / "June" spoken in Allegretto, Presto and Prestissimo styles were made as shown in Fig. 7.10 on p. 136. In utterance(a_1)which is spoken in the Allegretto style, the presence of the initial /th/ in the syllable /ˋthuʔ / is indicated by a fill of voicelessness preceding the spike which shows the release of the stop closure. The spike is absent in the (a_2)utterance which is spoken in the Presto style and this indicates that we have a fricative instead of a stop (see rule (19) on p. 126). In both the Allegretto and the Presto styles, the formants of the vowel /u/ are clearly distinct from the preceding vowel /i/; but this is not the case of /u/ in utterance(a_3)which has been spoken in the Prestissimo style. All we can see is a glide from the vowel/i/ to /u/. /u/ in this

Fig. 7.10.

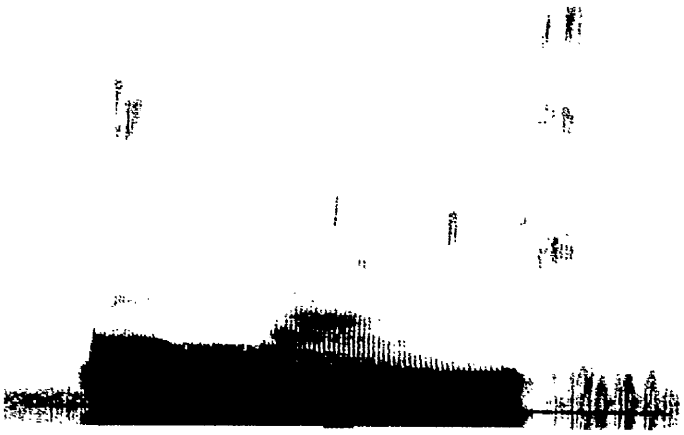
(a) / ˈmi? ˋthu? naa / " June "
3 3 1



(a) Allegretto : [mi thu naa]
1



(a) Presto : [mi ɦu naa]
2



(a) Prestissimo : [miw naa]
3

position must be non syllabic or /w/ and this is supported by the less intensity in the formant in comparison with the intensity of the formants of the preceding /i/.

The other change which takes place in the Prestissimo style occurs in the unaccented syllable with a nasal ending.. As we have seen, the vowel in this type of syllable becomes nasalized by rule (18) on p.125. Rules (19) and (20) on p. 126 state that aspirated segment preceding this vowel becomes the aspirated fricative /h/ while all segments other than the aspirated and the fricative /s/,/f/ become one of the nasal in the Presto style. In the Prestissimo style, further changes take place. For it has been observed that in this style, the segment which is [+syllabic] in this type of syllable, transfers its syllabic nature to the following nasal and then is deleted . This type of syllable in the Prestissimo style consists therefore only of the initial consonant and the syllabic nasal. These changes may be described by the following two rules :

(28)

$$[+\text{nasal}] \longrightarrow [+\text{syl}] \;/\; \underset{\left[\begin{smallmatrix}-\text{tense}\\+\text{nasal}\end{smallmatrix}\right]}{\text{V}} \text{———}$$

(29)

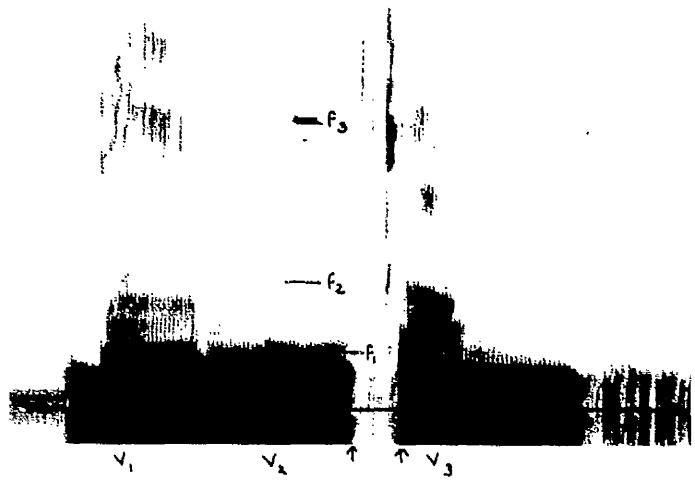
$$[+\text{syl}] \longrightarrow \emptyset \;/\; \text{———} \left[\begin{smallmatrix}+\text{syl}\\+\text{nasal}\end{smallmatrix}\right]$$

Examples

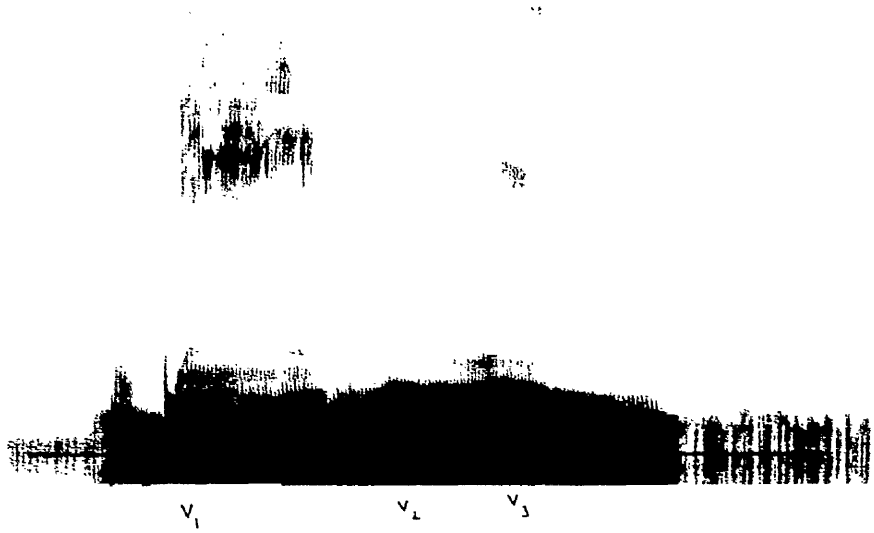
(30)

Phonological rep.	Allegretto	Presto	Prestissimo
/ dii ˇmuan kan / "One might just as well.."	[dii muan kan]	[dii mwannan]	[dii mn̩n̩n̩]
/ tciŋ tciŋ ˆkha?/ "honestly."	[tciŋ tciŋ kha]	[ɲiŋ tciŋ ˆkha]	[ɲŋtciŋ kha]
/tham tcon taaj/ "work to death"	[tham tcon taaj]	[tham ɲon taaj]	[thamn̩ntaaj]
/ ˋphit ˇsan jaa/ "break one's promise."	[phit san jaa]	[phit san jaa]	[phitsn̩jaa]

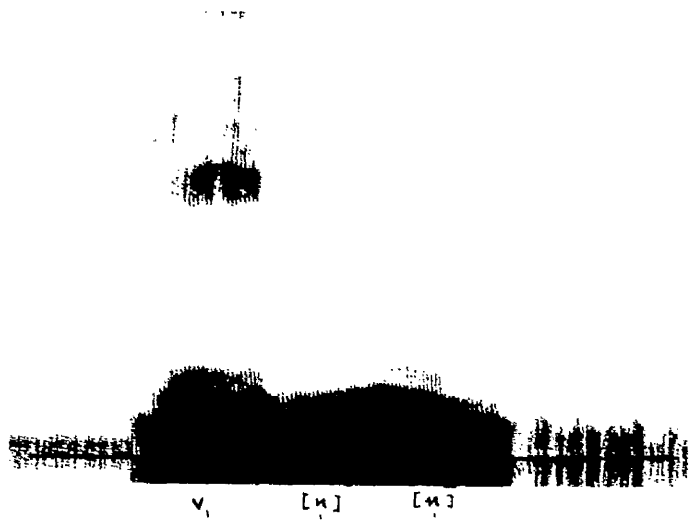
(a) / 1 dii 4 ˇmuan 3 kan / " One might just as well..."



(a_1) Allegretto : [dii muan kan]



(a_2) Presto : dii muan ŋan



(a_3) Prestissimo : [dii m n̩ ŋ n̩]

To illustrate these changes, spectrograms of the utterance /dii$^{\vee}$m uuan kan/ spoken in Allegretto, Presto and Prestissimo were made as shown in Fig,7.11 on p. 138. In (a_1) and (a_2), the vowel formants for the syllabic vowels /uu/ and /a/ are distinct and separated by the nasal or/ and the stop as the case may be (a nasal followed by a stop in the Allegretto style, and a sequence of two nasals in the Presto style.) In Fig.(a_3), the formants for the vowels /uu/ and /a/ seem to have disappeared, leaving but a long nasal resonance bar with varying degrees of intensity. Kinaesthetically, the author feels that the two nasals (indicated by [ŋ̩]) are syllabic.

To sum up, it seems that the fact that certain changes take place in the faster styles only, is a good evidence which supports our suggestion (on p.9) that one should recognize levels of styles in studying Accent in Thai. The changes in themselves are cues, not only for the degree of accent the syllable in question bears, but also for the style the speaker is using.

Footnotes VII

1. It is to be understood here that all changes which take place in the Allegretto style will also take place in the Presto and Prestissimo styles, but not the reverse.

2. See also Thawisomboon's remark about the central quality of the unstressed vowels in his thesis on p. 33.

3. For the change from /r/ to [l] in /ʔaʔ raj/, see rule (14) on p. 121.

4. SPE. p. 324.

5. The author has not been able to utilize the frequency measurements of The Thai vowels and tones as given by A.S. Abramson (1962) due to the fact that Abramson was using male informants. His figures of the pitch configurations of the five lexical tones are however used to illustrate their pitch contours, as shown on p. 142 and p. 143.

6. The author must apologize for the quality of the reproductions of the spectrograms in this chapter, which often fail to show what the original spectrograms have illustrated, especially in Fig. 7.3(a), Fig.7.4(a) and Fig. 7.11(a). The original spectrograms are in the author's possession. For measuring purpose, grid A is enclosed in this thesis.

7. A.S. Abramson (1962) p. 8.

CHAPTER VIII

PHONETIC RELAIZATION RULES III : PITCH FEATURES

8.0. In the last two chapters, we were concerned with the Phonetic Realization Rules which assign to the phonological representations the length and the segmental features for the segments as they would occur in the phonetic representations, as the result of the Accent Placement Rules. In this chapter, we will be concerned with the analyses of the lexical tones in terms of a sequence of pitch height features as outlined by N.H. Woo (see Chapter I, 1,2b , p. 17 - 24.) on the one hand; and will look at the effect the Accent Placement Rules have on the pitch contours of the lexical tones on the other.

8.1. There are 5 lexical tones in Standard Thai : the mid tone (unmarked), the low tone (˨), the high tone (˥˦), the falling tone (˥˧) and the rising tone (˧˥). An acoustic analysis of these tones have been given by Abramson[1] and his graphs of the fundamental frequency variations for single vowel and double vowel Thai syllables are reproduced in Fig. 8.1. and Fig. 8.2. on page 142 and page 143 respectively.

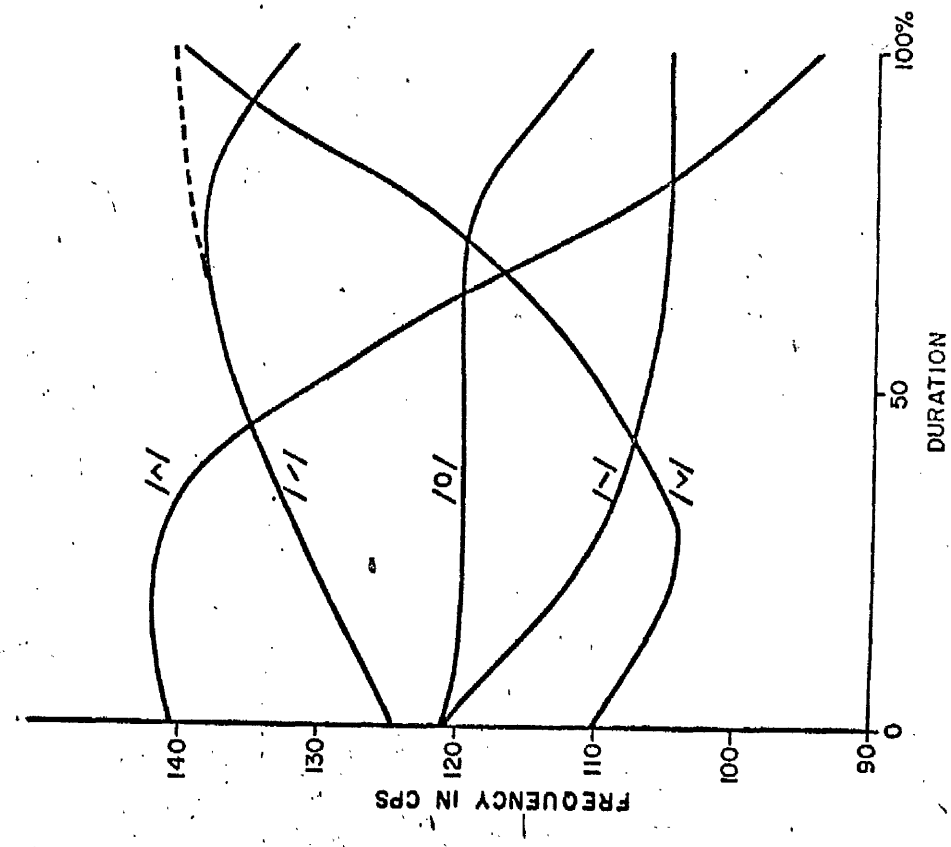


FIG. 8.1 TONES ON SINGLE VOWELS

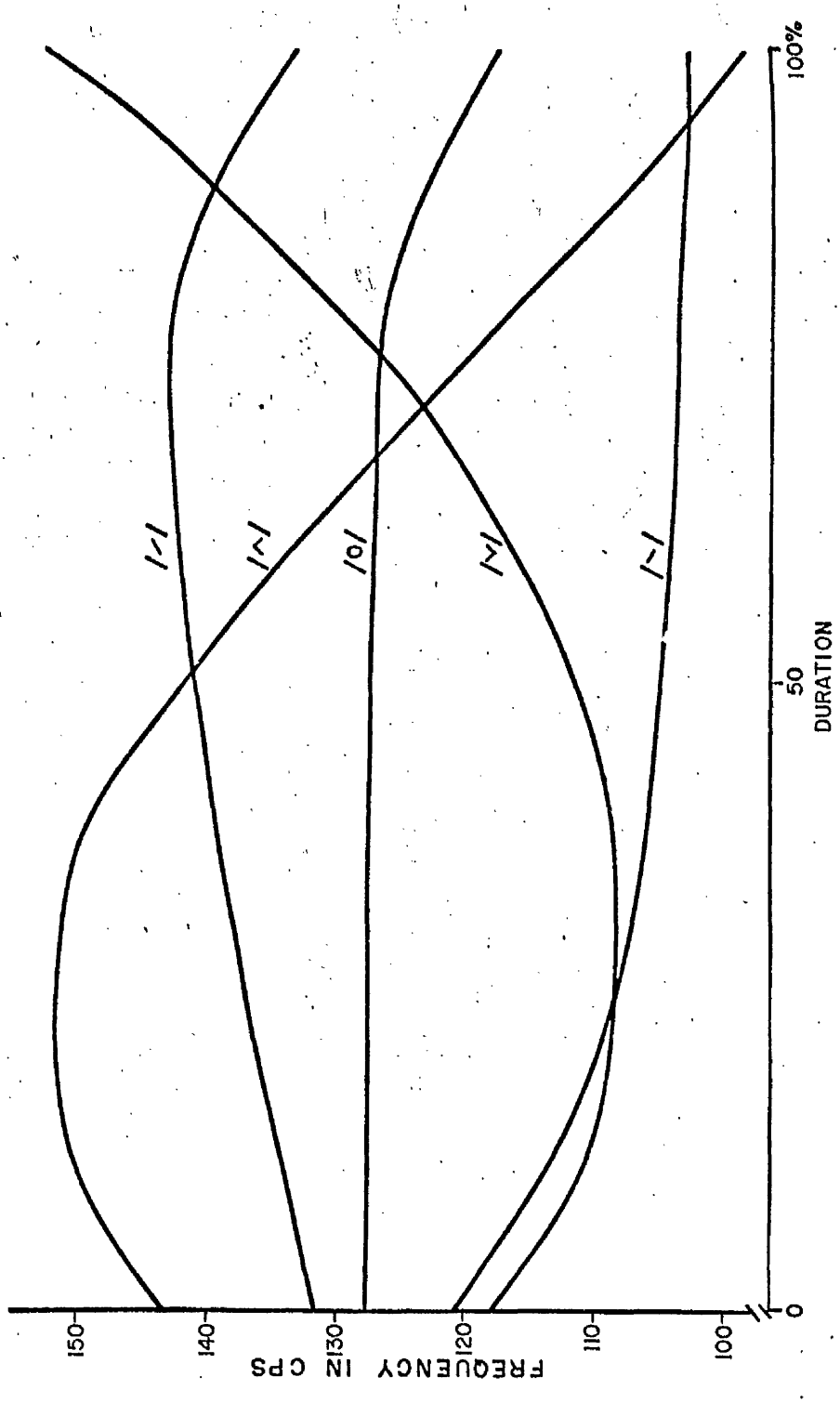


FIG. 8.2 TONES ON DOUBLE VOWELS

The tonal restrictions on the syllable may be summarized as follows:

Single vowel syllables ending in a stop (including the glottal stop) have only high or low tones[2] and the double vowel syllables ending in a stop have only falling or low tones.

These restrictions may be stated in the following morpheme structure conditions, (1) and (2) :

(1) $$\text{Tone} \longrightarrow \left\{\begin{matrix}\text{low tone}\\ \\ \text{high tone}\end{matrix}\right\} \Big/ C\left(\left\{\begin{matrix}L\\ W\end{matrix}\right\}\right) \underline{\quad} \; \overline{V} \; \begin{bmatrix}-\text{cont.}\\ -\text{nasal}\end{bmatrix}$$

(2) $$\text{Tone} \longrightarrow \left\{\begin{matrix}\text{low tone}\\ \\ \text{fallingtone}\end{matrix}\right\} C\left(\left\{\begin{matrix}L\\ W\end{matrix}\right\}\right) \underline{\quad} \; \overline{V} \; (G) \begin{bmatrix}-\text{cont}\\ -\text{nasal}\end{bmatrix}$$

G = non-syllabic vowel.

Let us now look at the possible syllable structures in Standard Thai. These structures may be presented in (3)

(3) $$C\left(\left\{\begin{matrix}L\\ W\end{matrix}\right\}\right) \; V \quad (G_1) \quad \left\{\begin{matrix}G_2\\ N\\ S\end{matrix}\right\}$$

N = nasal segment
S = stop segment
G_1, G_2 see below.

When V is distinguished from G_1 by the feature [+syl] only, then we have a case of a geminated vowel. When V differs from G_1 in its place of articulation, and is followed by G_2, then G_1 must be /a/ and G_2 must be either /j/ or /w/ Examples:

(4)

/ mu̯aj / " to be aching"

/ dia̯w / " alone, single handed."

It is clear from (3) that if one excludes the initial consonant

and the following liquid or /w/, and uses the number of sonorant segments in the syllable as a criterion, then one may classify syllables in Standard Thai into three types, namely those with one sonorant segment, those with two sonorant segments and those with three sonorant segments. (5) shows the types of syllables which fit into this classification :

(5)

1 sonorant	2 sonorants	3 sonorants
V S (including/ʔ/	V G_1	V G_1 G_2
	V G_1 S	V G_1 N
	V N	

(G_1 = nonsyllabic V, G_2 = /j/,/w/)

But if ones compare (5) with the situation in length in Chapter VI, one finds that (5) is not supported by the evidence given by the length situation; for there is a basic difference between the length of a consonant which follows a single vowel and that of a consonant which follows a geminated vowel. Thus [length 3] is assigned to the former while [length 2] is assigned to the latter (see p.100-1). This length difference seems to justify the rule in (6)

(6)

$$C \longrightarrow C\ C \ /\ \underset{[\text{Accent 1}]}{V}\ \_\_\_$$

(6) states that V S is phonetically [V S S] , and V N is phonetically [V N N] . Since the final stops are non sonorant segments, this phonetic fact does not affect its classification above; while it does affect the V N type of syllables which now, according to (6), falls into the third type namely those syllables with three sonorant segments.

Now let us consider the situation of length in syllables of the type V G_1 (e.g. /aa/, /aj/, /aw/) and those of the type V G_1 G_2 (e.g. /aaj/, /aaw/ /uaj/ etc...) in Table 6. 2-6 on p. 94 - 96). It seems that there is no basic difference in the total length of the two types of syllables. This observation seems to justify a rule in (7)

(7)

$$G \longrightarrow G\ G \Big/ \underset{[\text{Accent 1}]}{V} \_\_\_\_$$

(7) would give the instruction that /aa/ is to be rewritten as [aaa], /aj/ as [ajj] and /aw/ as [aww]. (6) and (7) may be conflated into (8)

(8)

$$\begin{array}{cc} 1 & 2 \\ V & \begin{Bmatrix} G \\ C \end{Bmatrix} \end{array}$$

$$1 \quad 2 \longrightarrow 1\ 2\ 2 \Big/ \underset{[\text{Accent 1}]}{V} \_\_\_\_$$

(8) requires that the phonological classification in (5) should be modified, at the phonetic level. The modification of (5) is given in (9) :

(9)

1 sonorant	2 sonorants	3 sonorants
V S S	V G_1 S	V G_1 G_2
		V N N
		V G_1 N

Applying the tonal restrictions as stated by (1) and (2) to (9) we have the following picture :

(10)

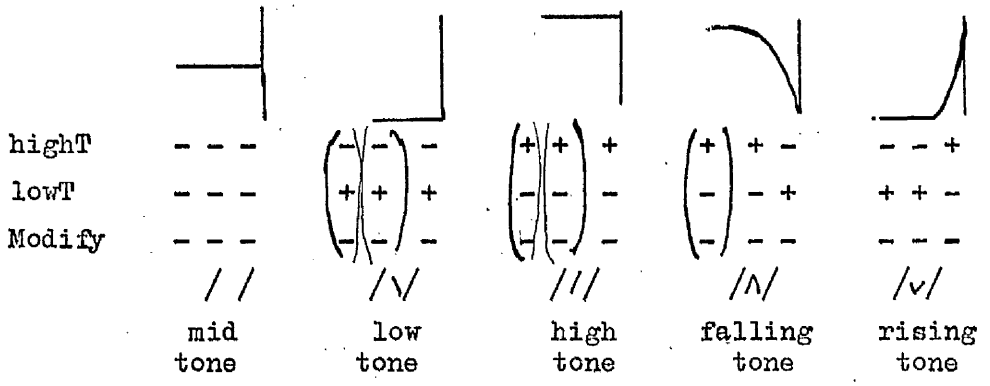
	1 sonorant	2 sonorants	3 sonorants
	V S S	V G_1 S	V G_1 G_2
			V N N
			V G_1 N
Tones	low tone /\/	low tone /\/	mid tone / /
	high tone ///	falling tone/^/	low tone /\/
			high tone ///
			falling tone /^/
			rising tone/v/

According to Woo's theory, each lexical tone is analysed into a sequence of pitch heights using the features [highT] , [lowT] , and

[modify] . Each pitch height is to be assigned uniquely to one sonorant segment in the syllable (excluding the initial consonant and the following liquid or /w/) . (10) shows that certain tones may be assigned to syllables with a varying number of sonorant segments. This means that in our analysis of the tones, we will have to recognize for each tone, matrices corresponding to optional and obligatory pitch heights. Table 8.1. below gives the analysis of the Standard Thai five lexical tones in terms of pitch height features : [highT] , [lowT] and [modify] . The analysis gives the specifications for the pitch features. Each matrix is understood to be part of the feature matrix of some sonorant segment and constitutes what is referred to as a "pitch height". The brackets represent the optional pitch heights, i.e. those which do not apply when the lexical item concerned does not contain the maximum number of sonorant segments.

TABLE 8.1.

The analysis of Thai lexical five tones



Although in Woo's theory, no need was found for the concept of optional pitch heights of the lexical tones, this treatment seems to be justified in Thai by the duration of the sonorant segments on the one hand, and, on the other hand, by its value in partially explaining the difference between the so-called "allotones"[3]. The illustrations of allotones of the low tone, the high tone and the falling tone, the analyses of which contain optional pitch heights on syllables with a varying number of

Figure 8.3. (a)-(d)

ALLOTONES

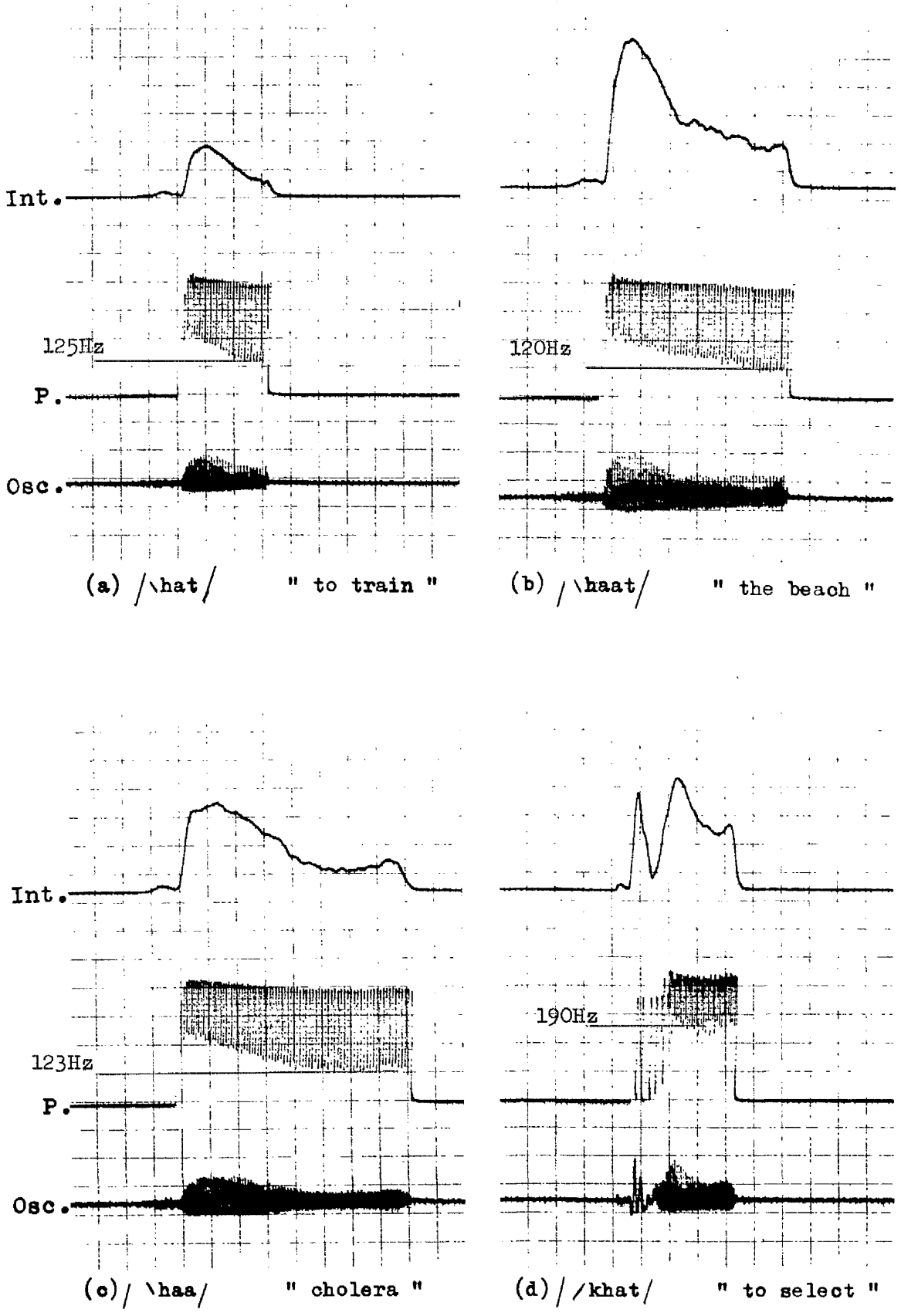
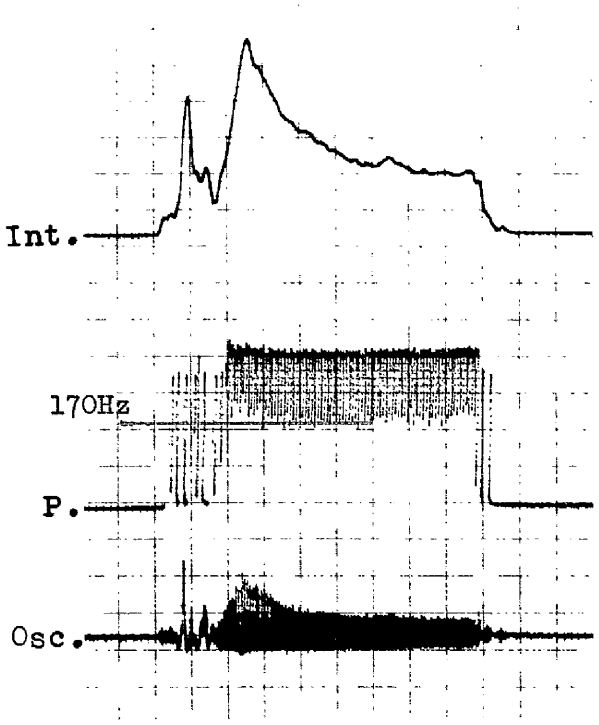
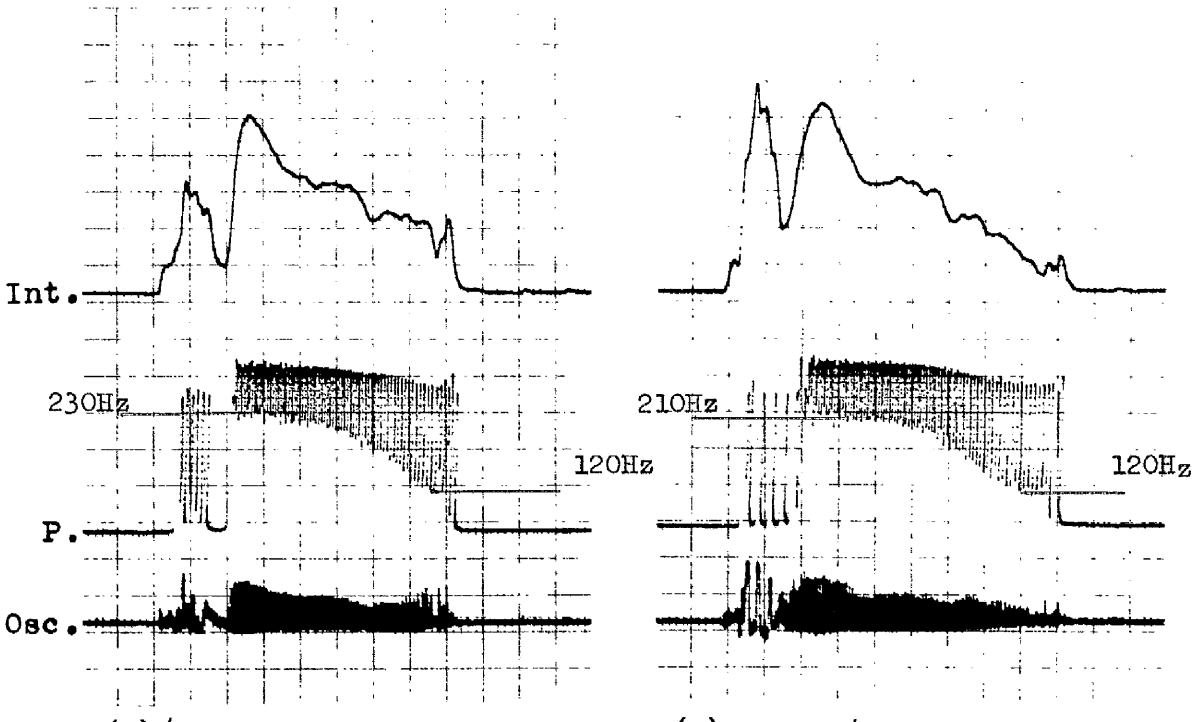


Figure 8.3 (e)-(g)



(e) /ˊkhaa/ " to trade "



(f) /^ khaat/ " to guess "

(g) /^ khaa/ " to kill "

50 Hz

sonorant segments, are given in Fig. 8.3. on p.148-149 . Another value of this "optional pitch height" concept has already been stated in connection with the criticism made earlier on, on Woo's theory in the introduction (p. 24.). For measuring the intensity and the frequencies of the utterances illustrated in this chapter, grid B has been enclosed.

There are two basic principles, apart from Woo's theory, which are used in the analyses of the Thai tones in Table 8.1. on p. 147 namely the frequency analysis as given in Fig. 8.1. on p.142 and in Fig. 8.2. on p.143 on the one hand; and the use of the marking convention as adopted by Woo . Woo's marking conventions are reproduced in Table 8.2. below :[4]

TABLE 8.2: THE MARKING CONVENTIONS.

I. $\begin{bmatrix} -son \\ \alpha\,voiced \end{bmatrix} \longrightarrow \begin{bmatrix} -\alpha\,highT \\ \alpha\,lowT \\ -modify \end{bmatrix}$

II. $\begin{bmatrix} -son \\ -syl \end{bmatrix} \longrightarrow \begin{bmatrix} -highT \\ -lowT \end{bmatrix} / \#\ \#\ \_\_\_\_$

III. $\begin{bmatrix} +son \\ -syl \end{bmatrix} \longrightarrow \begin{bmatrix} \alpha\,highT \\ \beta\,lowT \end{bmatrix} \#\ \#\begin{bmatrix} -syl \\ \alpha\,highT \\ \beta\,lowT \end{bmatrix} \_\_\_\_$

IV. $[\underline{u}\ highT] \longrightarrow \begin{cases} [-highT] / \underline{\quad}_{+syl} & (a) \\ [\alpha\,highT] / \begin{bmatrix} +son \\ \alpha\,highT \end{bmatrix} \_\_\_\_ & (b) \end{cases}$

V. $[+highT] \longrightarrow [-lowT]$

VI. $[\underline{u}\ lowT] \longrightarrow \begin{cases} [-lowT] / \underline{\quad}_{+syl} & (a) \\ [\alpha\,lowT] / \begin{bmatrix} +son \\ \alpha\,lowT \end{bmatrix} \_\_\_\_ & (b) \end{cases}$

VII. $[+lowT] \longrightarrow [-highT]$

VIII. $\begin{bmatrix} -highT \\ -lowT \end{bmatrix} \longrightarrow [-modify]$

IX. $[\alpha\ \text{modify}] \longrightarrow \begin{cases} [-\text{modify}] \ / \ \underline{\qquad}\ +\text{syl} & \text{(a)} \\ [\alpha\text{modify}] \ / \ \left[\begin{matrix}+\text{son} \\ \alpha\text{modify}\end{matrix}\right] \underline{\qquad} & \text{(b)} \end{cases}$

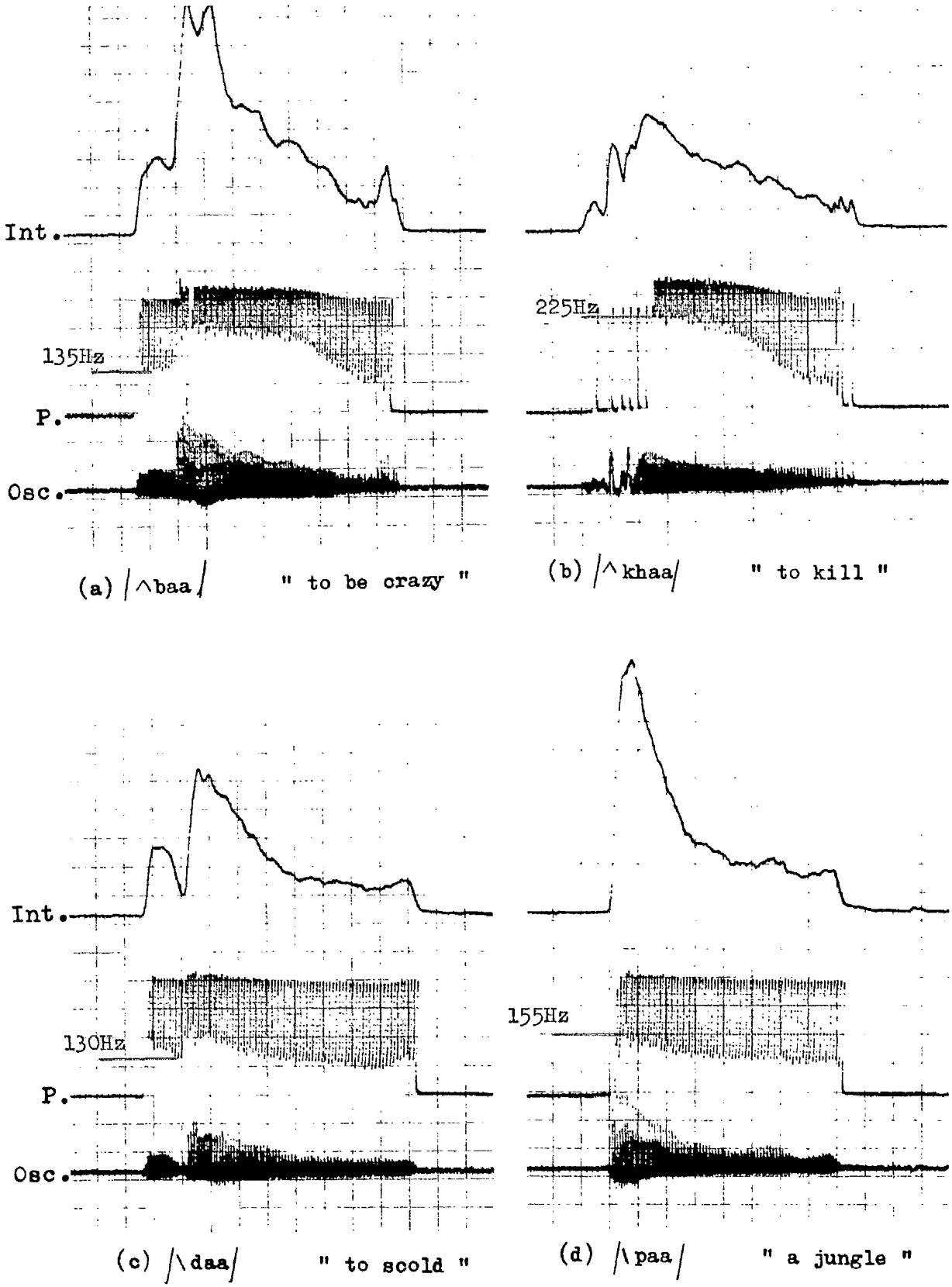
Convention I

$$\begin{bmatrix} -\text{son} \\ \alpha\text{ voiced} \end{bmatrix} \longrightarrow \begin{bmatrix} -\alpha\text{highT} \\ \alpha\text{lowT} \\ -\text{modify} \end{bmatrix}$$

states that voiced non-sonorants are low toned, and the voiceless non-sonorants are high toned. In articulatory terms, this means that the voiced non-sonorant segments "depress" the pitch while the voiceless non-sonorant segments "raise" it. This convention, as far as the Thai tones are concerned, is certainly true of the presyllabic stops. Thus, if the first pitch height of the tone is [+highT] and the initial segment of that syllable is a voiced non-sonorant (i.e. /b/ or /d/), the pitch will start low moving to a high pitch and hence gives the pitch contour of a rising tone. This rising contour does not take place when the initial segment is a voiceless one. Conversely, if the first pitch of the tone is [+lowT] and a voiced non-sonorant precedes this pitch, the pitch will start low and move towards a lower pitch. When the initial segment is a voiceless non-sonorant segment, the starting pointwill be higher , the pitch then moves to the same low pitch height. Fig. 8.4. below shows the pitch configurations of the Thai falling tone and low tone with initial voiced and voiceless non sonorant segments respectively: the falling tone, the first pitch of which is [+highT] , may start as low as 135Hz (see Fig.8.4(a)) if a voiced non-sonorant precedes the syllabic nucleus; and may start as high as 225Hz (see Fig 8.4(b)) if a voiceless non-sonorant precedes the syllabic nucleus. As for the low tone in syllables with a voiced non-sonorant initial, the pitch usually starts in the [lowT] region (130Hz in Fig. 8.4(c)) while the same tone in syllables with a voiceless non-sonorant usually starts in the [-highT, -lowT] region which is between 160Hz-140Hz.(For the range of frequencies for regions of the pitch features used, see (10A) On p. 156.). In the illustration given, the pitch starts at 155Hz(see Fig.8.4(d)).

Figure 8.4. (a) - (d)

The influence of the pre-syllabic voiced and voiceless stop segments on the pitch contour.



Convention II

$$\begin{bmatrix}+son\\-syl\end{bmatrix} \longrightarrow \begin{bmatrix}-highT\\-lowT\end{bmatrix} \;/\; \#\ \# \_\_\_\_$$

states that initial nonsyllabic sonorants i.e. nasals , glides and liquids cannot be contrastive with respect to pitch since the contrastive pitch has always been noted to be the unique property of the syllabic nucleus. There are other evidence to support this convention (see Woo(1969) p.170-1) . However, it should be noted that both the initial nasal, liquid and glide tend to depress the pitch of the tone, but not to the same extent as the voiced non-sonorant segments do. In fact, this "depression" of the tone by the initial voiced segment is reflected in the acoustic analysis of the high tone in Fig. 8.1. on p. 142 where the high tone is shown as a rising from just above the mid level to a high level . Illustrations of the influence of the initial non syllabic sonorant segment on a falling tone and a low tone are shown in Fig. 8.5. on p. 154, which contrast the starting points of the pitch contours in syllabjes with a falling tone or a low tone with presyllabic nasal or liquid segment, with the starting points of the same tones with a voiced or voiceless initial as shown earlier in Fig.8.4 on p. 152.

Convention III

$$\begin{bmatrix}+son\\-syl\end{bmatrix} \longrightarrow \begin{bmatrix}\alpha highT\\\beta lowT\end{bmatrix} \;\#\ \#\begin{bmatrix}-syl\\\alpha highT\\\beta lowT\end{bmatrix} \_\_\_\_$$

states that when the glides, liquids or nasals are part of the initial consonant cluster, the pitch is assimilated from the preceding consonant. In Thai, the nasals do not occur in this position. However, as admitted by Woo(1969) p. 17), it is a moot question whether this statement is correct or whether the assimilation should be from the following syllabic. For an illustration, see /prun/ " to prepare (food) " in Fig. 8.6b on p. 158.

Convention V

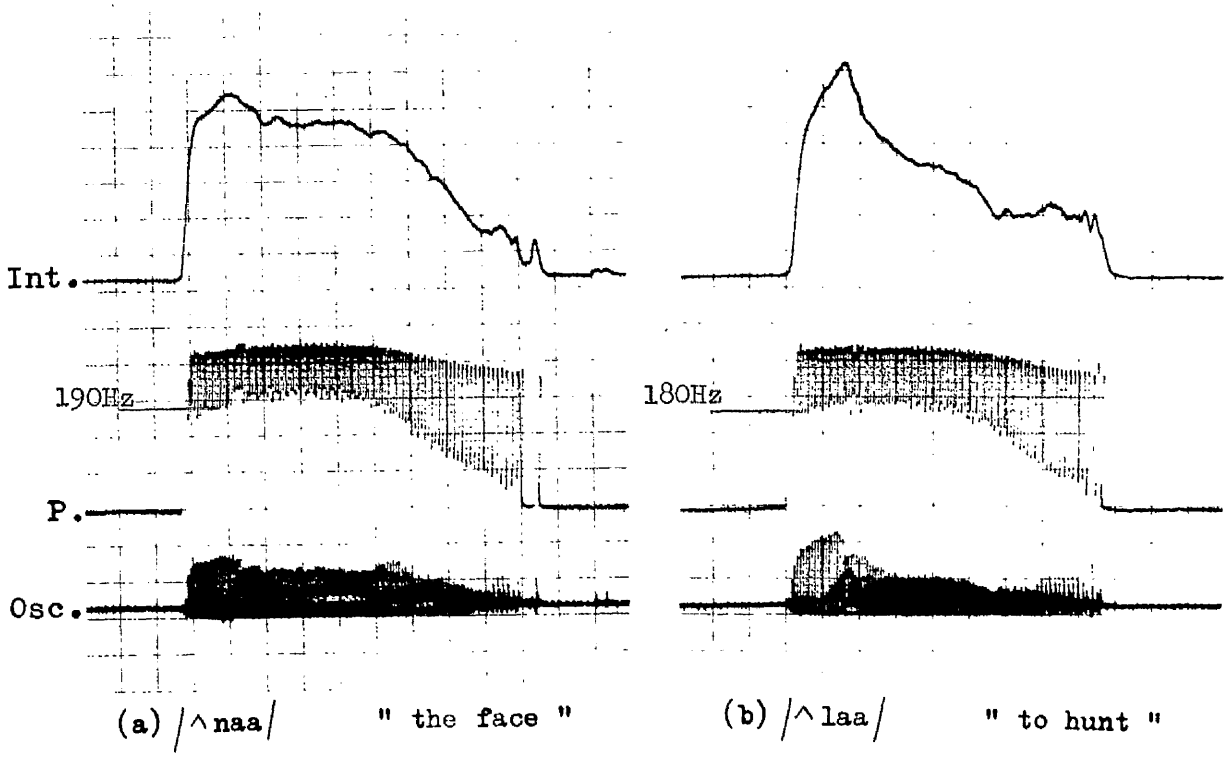
$$[+highT] \longrightarrow [-lowT]$$

Convention VII

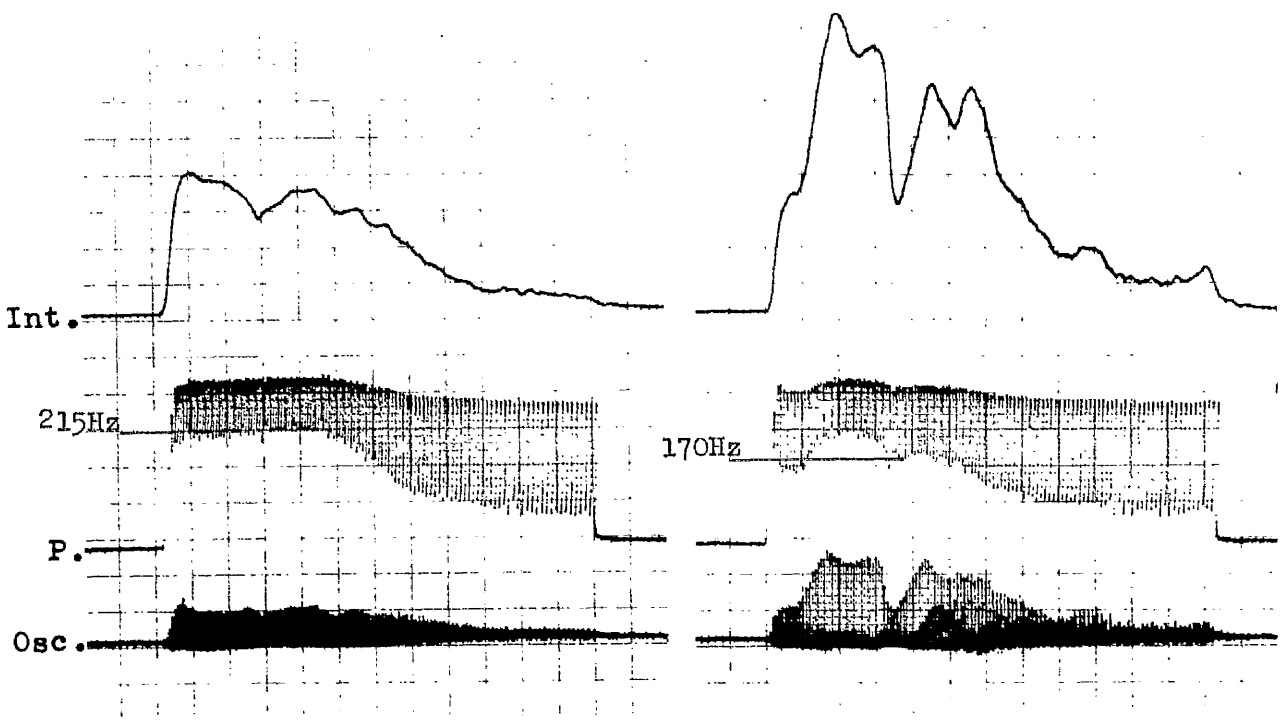
$$[+lowT] \longrightarrow [-highT]$$

Figure 8.5. (a)-(d)

The influence of the pre-syllabic nasal and liquid segments on the pitch contour.



(a) /^naa/ " the face " (b) /^laa/ " to hunt "



(c) /ˊnɔɔj ˋnaa/ " a kind of fruit." (d) /^jii ˋraa/ " a kind of dried herbs "

50 Hz

These two conventions simply state that no segment is specified as $\begin{bmatrix}+\text{highT}\\+\text{lowT}\end{bmatrix}$.

Convention VIII

$$\begin{bmatrix}-\text{highT}\\-\text{lowT}\end{bmatrix} \longrightarrow \begin{bmatrix}-\text{modify}\end{bmatrix}$$

states that there is no segment specified as $\begin{bmatrix}-\text{highT}\\-\text{lowT}\\+\text{modify}\end{bmatrix}$

Conventions V, VII and VIII are in fact the three redundancy rules mentioned earlier on p. 21.

Conventions IVa, VIa and IXa are concerned with the unmarked value of the pitch feature for the syllabic segments, which is - . The author, however, is not interested in the evaluation of the features in this thesis.

Conventions IVb, VIb and IXb state that the unmarked value for the sonorant segment following a syllabic is not necessarily the mid tone; but rather the same pitch specification as the syllabic segment. This is because Woo feels that the sonorant segments following the syllabic cannot be evaluated in a marking system in any manner except relative to the syllabic, the first significant segment of a syllable's pitch contour.

Let us now compare the analyses of the Thai 5 tones in Table 8.1. on p. 147 with their corresponding frequency analyses as given by Abramson in Fig. 8.1 and Fig. 8.2. on p 142-143 . Acoustically, Abramson's high and mid tones have a final drop in the pitch contours. Yet he recognizes them both as static tones and in so doing, tacitly maintains that the final drops in themselves are non-contrastive. This final drop may be due to the decrease in intensity which makes it difficult to maintain a level pitch in the utterance. On the other hand, it should be pointed out that Abramson's analysis of the tones was carried out on the citation forms and it is quite likely that the pre-pause intonation may have exaggerated the drop. In the author's experiment, the final drop is not present on the mid or the high tones in connected speech. It is however, present on the mid tone when this is

phrase final. This diffirence is shown in the pitch contours of the phrase final / kɛɛŋ/ "curry" and the non phrase final / kɛɛŋ / in Fig.8.7a on p. 163 and Fig 8.6b on p. 158 respectively.

In the frequency analyses of the low tone and the rising tone, there is an initial drop present and the two tones have the pitch configurations ⌣ and ⌣/ respectively. The author analyses the former as a sequence of [+lowT −modify][+lowT −modify] [+lowT −modify]; and the latter as a sequence of [+lowT −modify][+lowT −modify][+highT −modify] . In other words, the initial drop has been excluded, since, according to the reason given by Woo in her analysis of the Mandarin "third" tone, " it is the natural consequence of the articulatory mechanism involved in producing the following low level tone"[5] for the larynx has to be lowered in order to produce the low pitch (see the definition of the feature [lowT] on p. 17). As for the initial drop on the high tone, it is present on-ly when the initial consonant is a voiced segment and thus can be accounted for by Conventions I and II on p. 151-153. Abramson , in his frequency analysis of this tone, uses the average from syllables which have either a voiced initial (/ˊnak /"/an expert",/ˊluaŋ /", to insert") and a voiceless initial (/ˊkhun/ "familiar", /ˊtchaa / "slow")[6].

For practical purposes, one should have some kind of frequency index in correlation with the features [+highT −modified], [+highT +modified], [−highT −lowT] , [+lowT +modified] and [+lowT −modified] . Exact measurements of the pitch heights of the five tones mean nothing since these pitch heights are subject to sentence intonation which is downdrifting (see Henderson's remark on intonation on p. 173) on the one hand; and on the sex of the speaker on the other. However, in the author's speech, a range of frequencies corresponding to the pitch heights mentioned above, is given below as a rough index.

(10A)

180Hz	1
160Hz	2
140Hz	3
130Hz	4
	5

1 = [+highT −modified], 3 = [−highT −lowT]

2 = [+highT +modified], 4 = [+lowT +modified]

5 = [+lowT −modified]

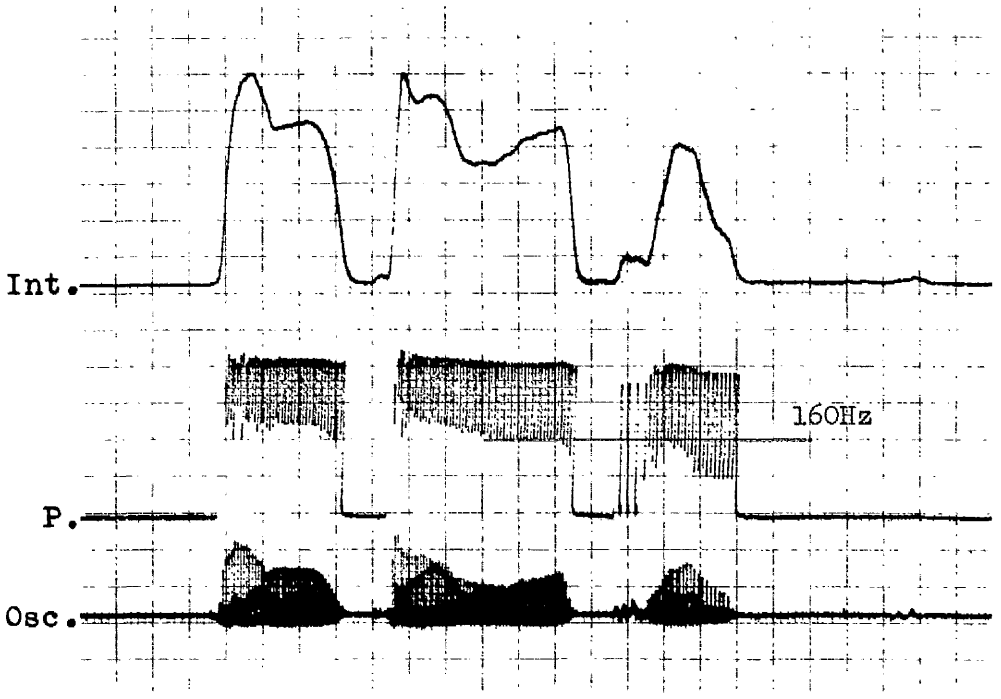
8.2. The analysis of the five tones in the previous section is in fact the analysis of the tones on syllables with [Accent 1] . In this and the next section, we will look at the pitch behaviour in syllables with [Accent 2] and in unaccented syllables (for the use of the term "unaccented", see p.108).

There seems to be very little difference in the pitch configurations of the five tones in syllables with [Accent 1] and syllables with [Accent 2]. The difference which occurs in the experiments lies in the shorter pitch contour on syllables with [Accent 2] due to the shorter duration of the sonorant segments in the syllable (see length assignment rules on p. 103). The pitch contours remain the same or very sligthly higher in most cases as shown by the measurements given in Fig. 8.6(a-k) on p. 158-162. The increase in frequency, shown in the illustrations being so small that it is probably imperceptible. Syllables bearing each of the tones, which occur in Fig.8.6. are all in non-phrase final position.

The basic difference in the pitch contours on syllables with [Accent 1] and those with [Accent 2] seems to lie in the greater length of sonorant segments in syllables with [Accent 1] as well as in the fact that syllables with [Accent 1] may occur before a pause when those with [Accent 2] may not. This means that the pitch contours of the former can have the extra long duration in this position and that they are more susceptible to the influence of phrase final intonation (see p.86-87) which usually brings the pitch down. Illustrations of the pitch contours of prepausal syllables with [Accent 1] are given in Fig.8.7 a,b,c,d,e, on p.163-164 to be compared with the pitch contours of the corresponding tones in syllables with [Accent 1] in non prepausal position, in Fig.8.6.b,d,f,h and k respectively . The measurements are given in the illustrations while the pause is represented by //. The phrase final intonation may bring the final pitch of a tone down as much as 40Hz as shown by the falling toned syllables in Fig.8.6(h) on p. 161 where the pitch falls to 130Hz, in contrast with the phrase final falling toned syllable in Fig.8.7.(d) on p.164 when the pitch falls to 90Hz. The exception to the lowering of the phrase final intonation is the rising tone when the phrase final rising toned syllable (Fig.8.7(e)) ends slightly higher (by 15Hz) than its corresponding non phrase final pitch in Fig.8.6(k).

Figure 8.6. (a) & (b)

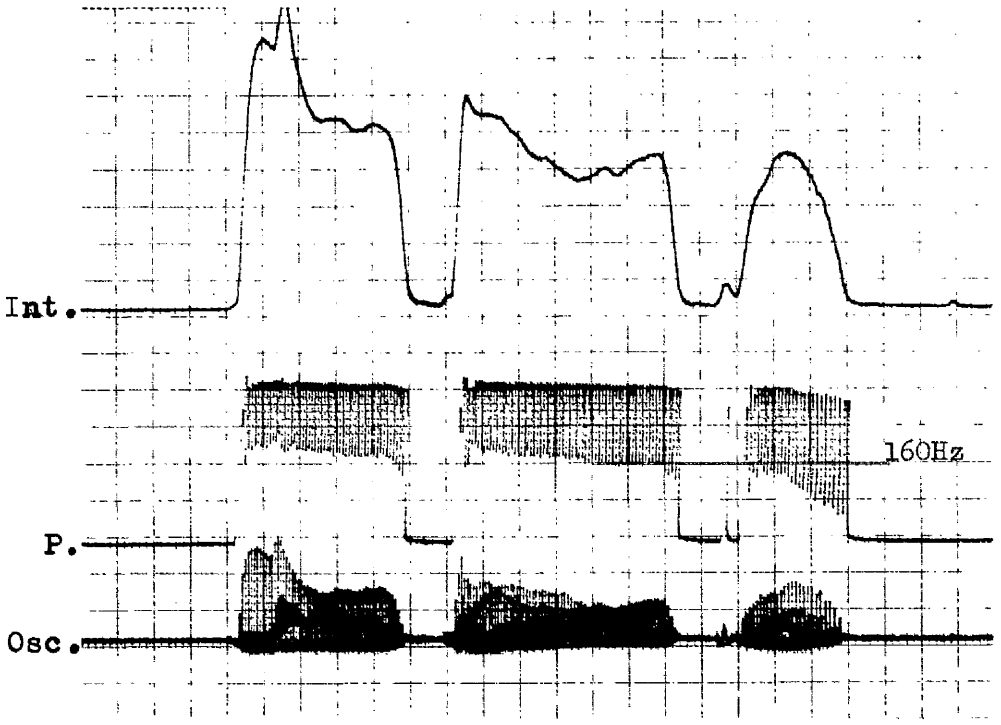
A comparison of the pitch contours of the tones on syllables with [Accent 2] and [Accent 1]



2

mid tone (a) / prun keen \phet /

" Make the curry."



1

(b) / prun keen \phet /

" You've made the curry too hot."

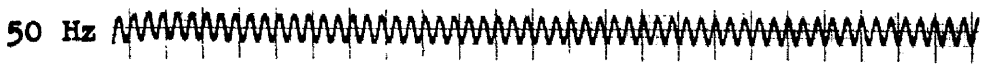
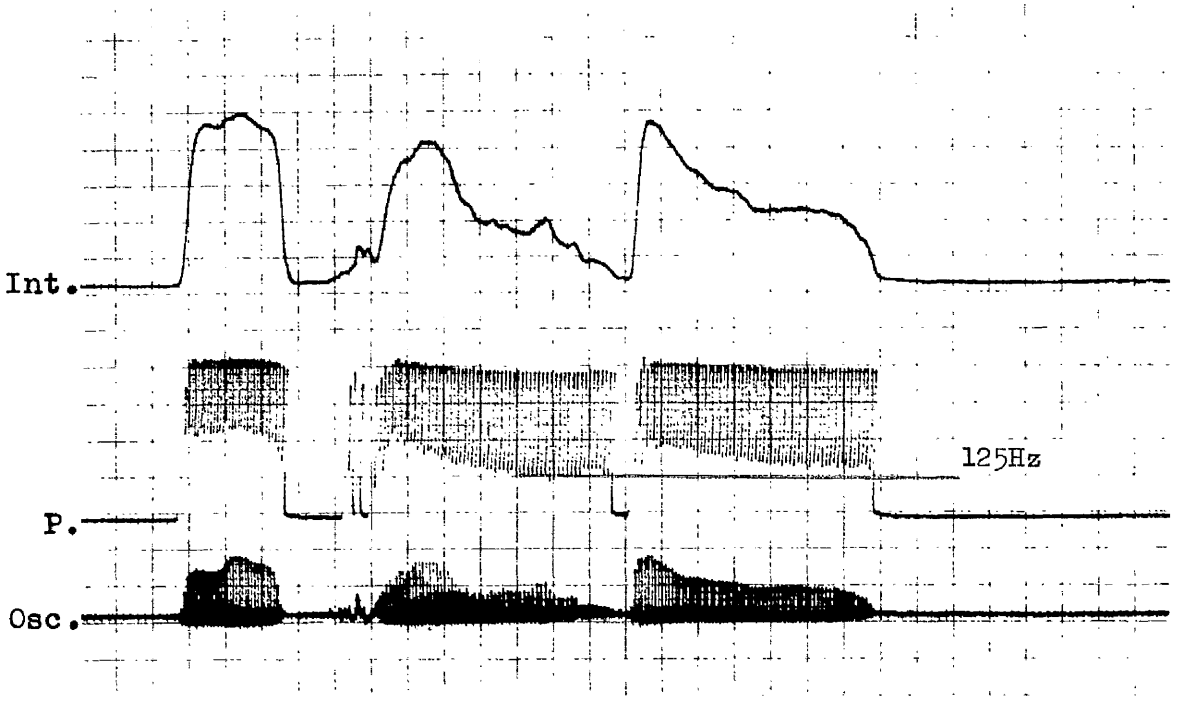
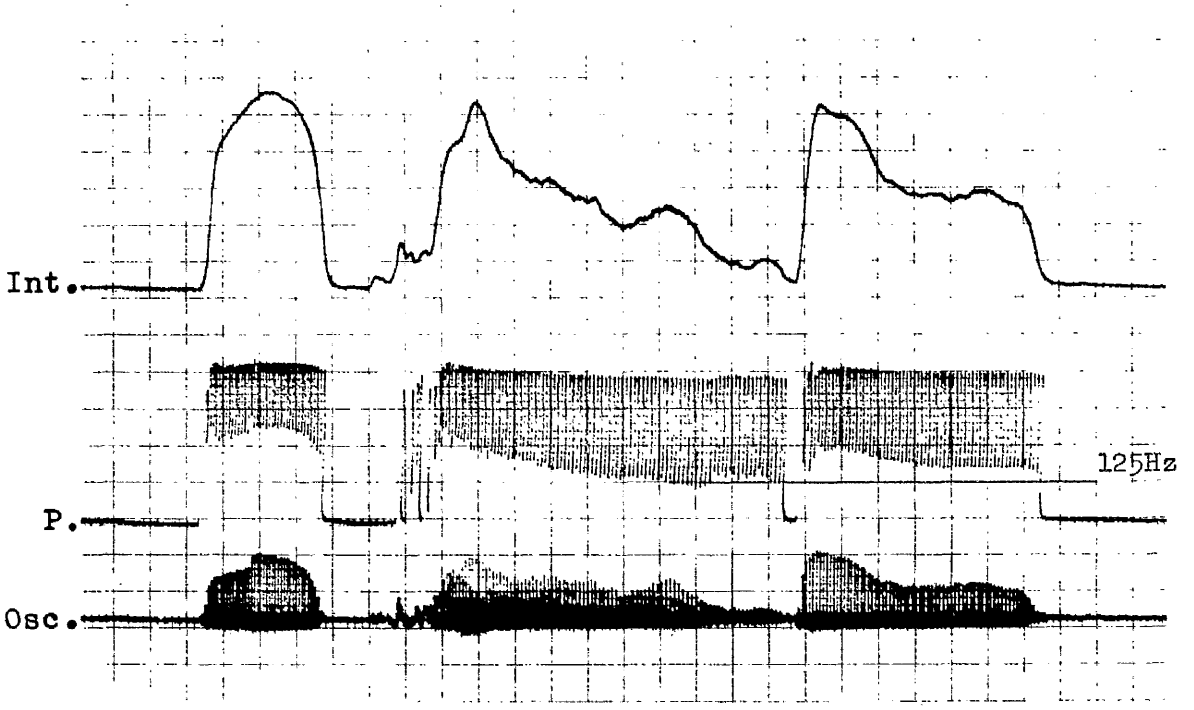


Figure 8.6 (c) & (d)



2
low tone (c) / mii \khaaw dii /
"There is good news. "



1
(d)/ mii \khaaw dii /
" Good, there is some news."

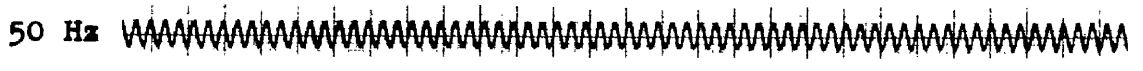
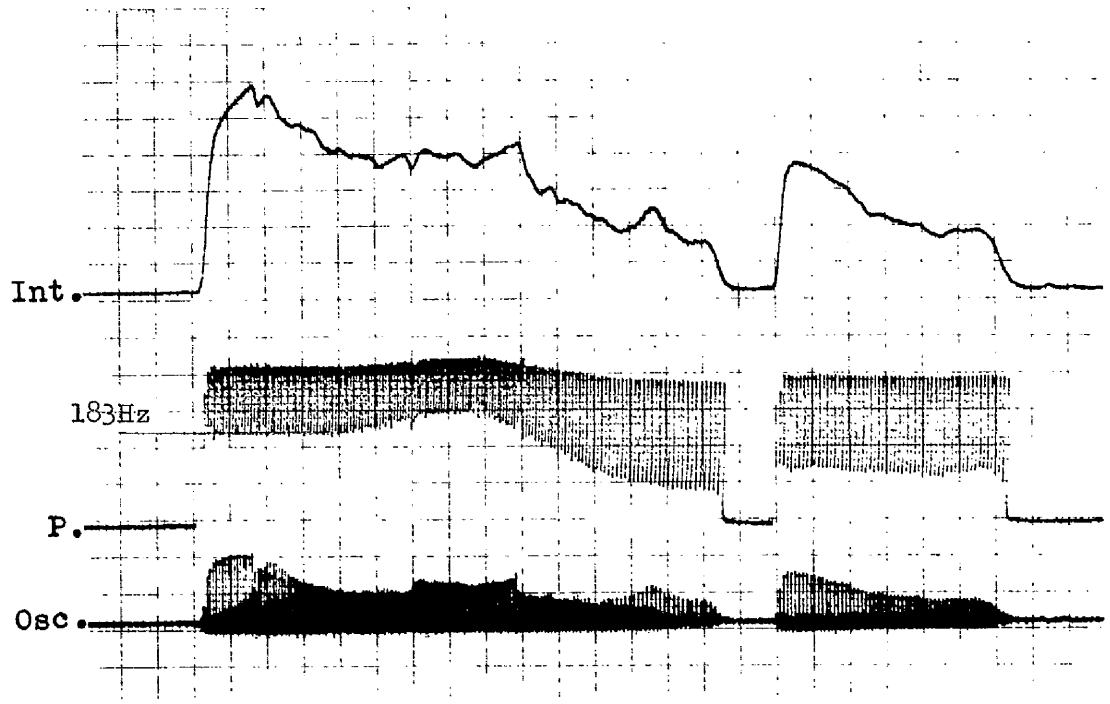
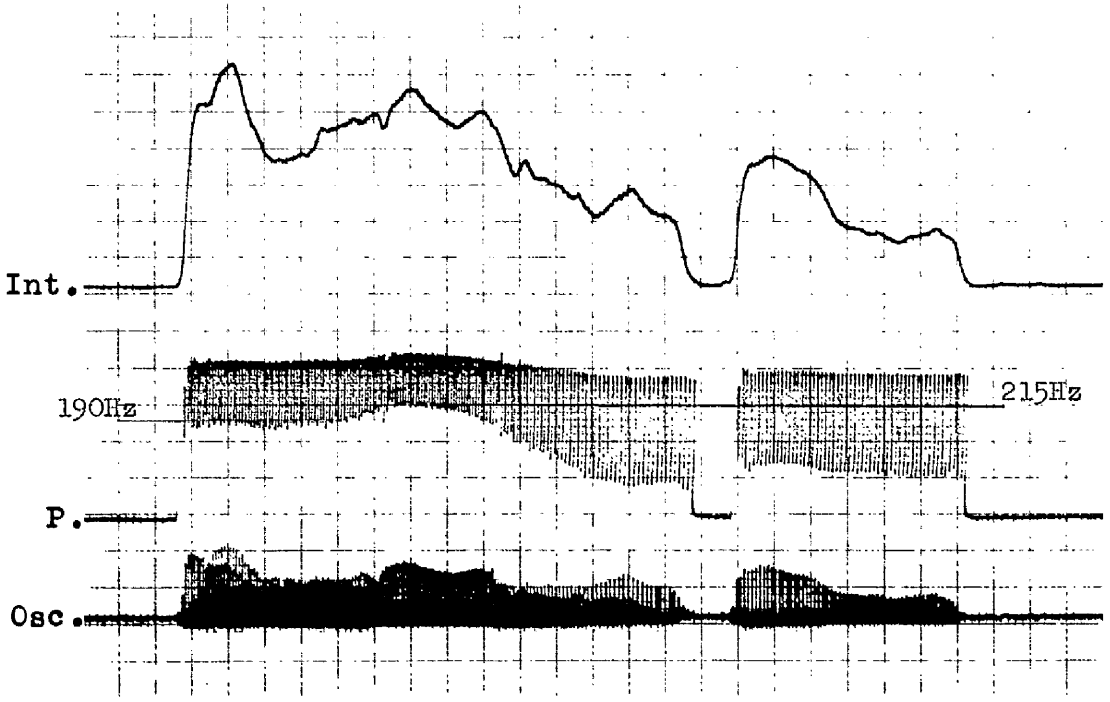


Figure 8.6 (e) & (f)

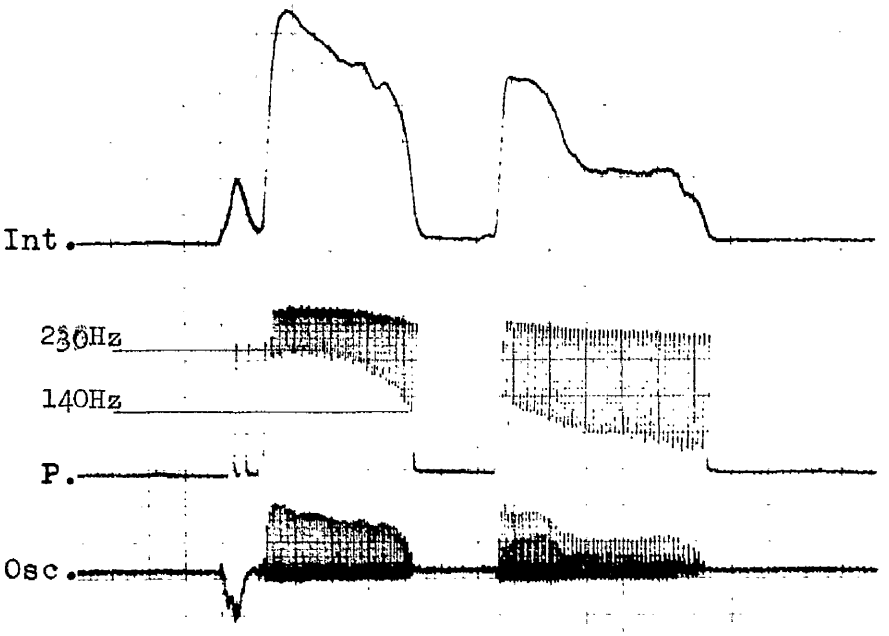


2
high tone (e) /ˊraan \maj dii /
"The new shop is good."



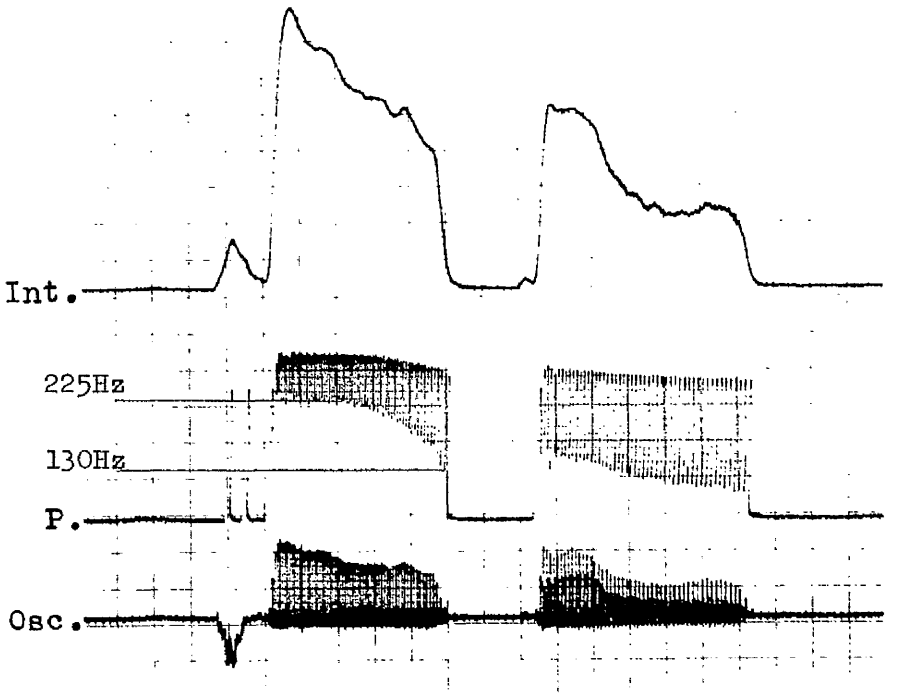
1
(f)/ ˊraan \maj dii /
" The shop is brand new."

Figure 8.6 (g) & (h)



falling tone (g) /^thii 2\kɣɣt/

" a birthplace "

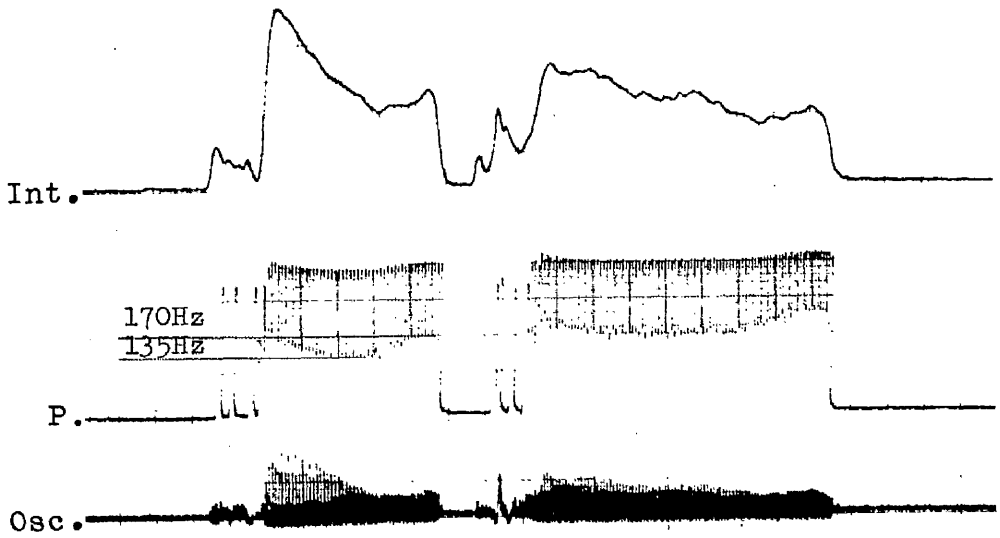


(h)/^thii 1\kɣɜt*/

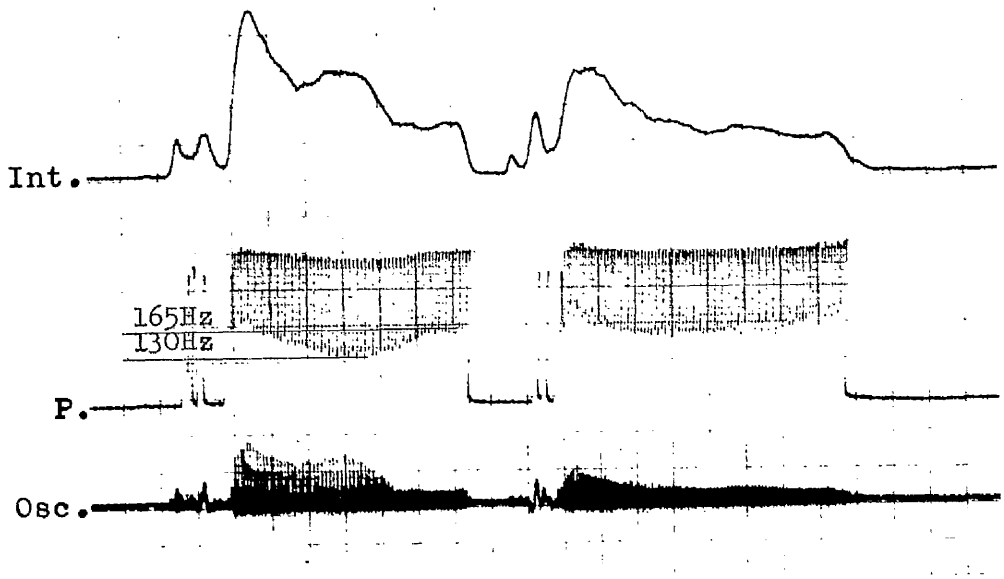
" Kert's land "

50 Hz

Figure 8.6 (j) & (K)



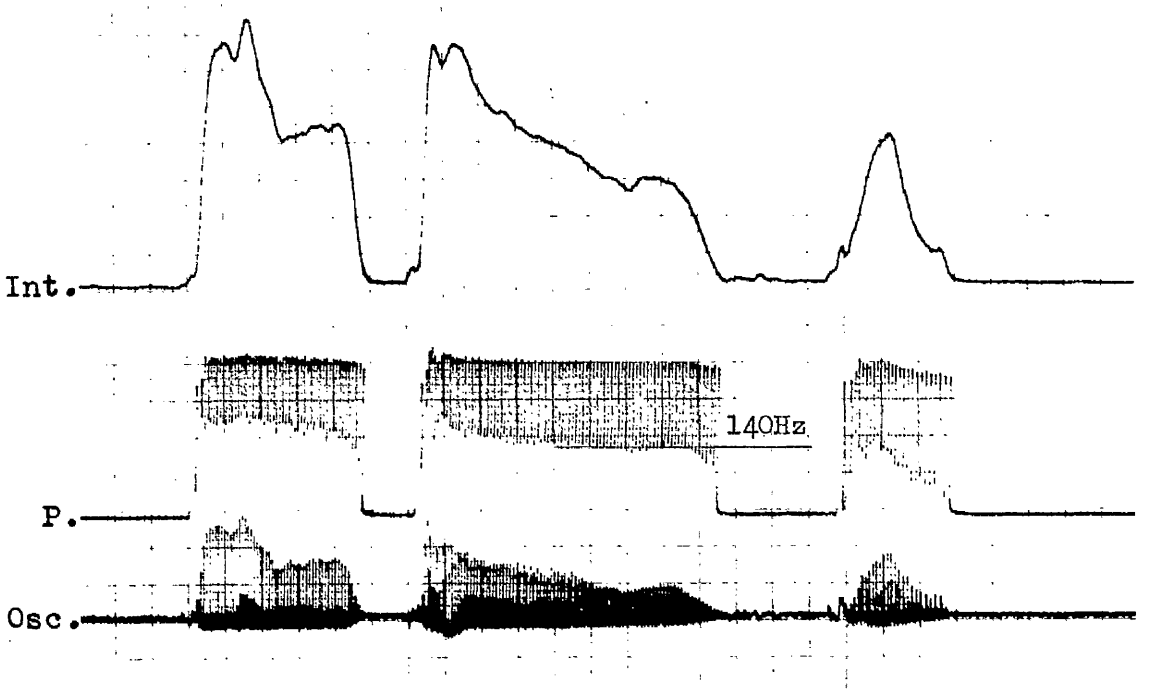
rising tone (j)/ ˇkhɔ̃ŋ ´khaaŋ /
" The leftovers "



(k)/ ˇkhɔ̃ŋ ´khaaŋ/
" The stuff is left overnight."

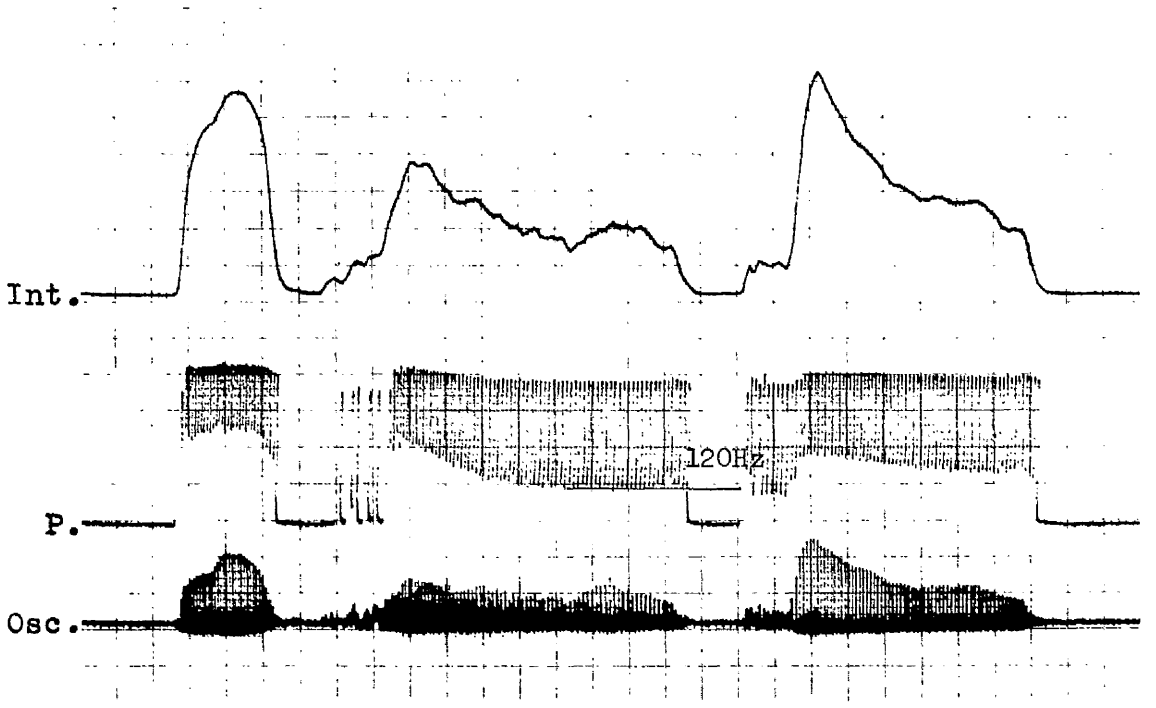
Figure 8.7. (a) & (b)

Tones in phrase final positions.



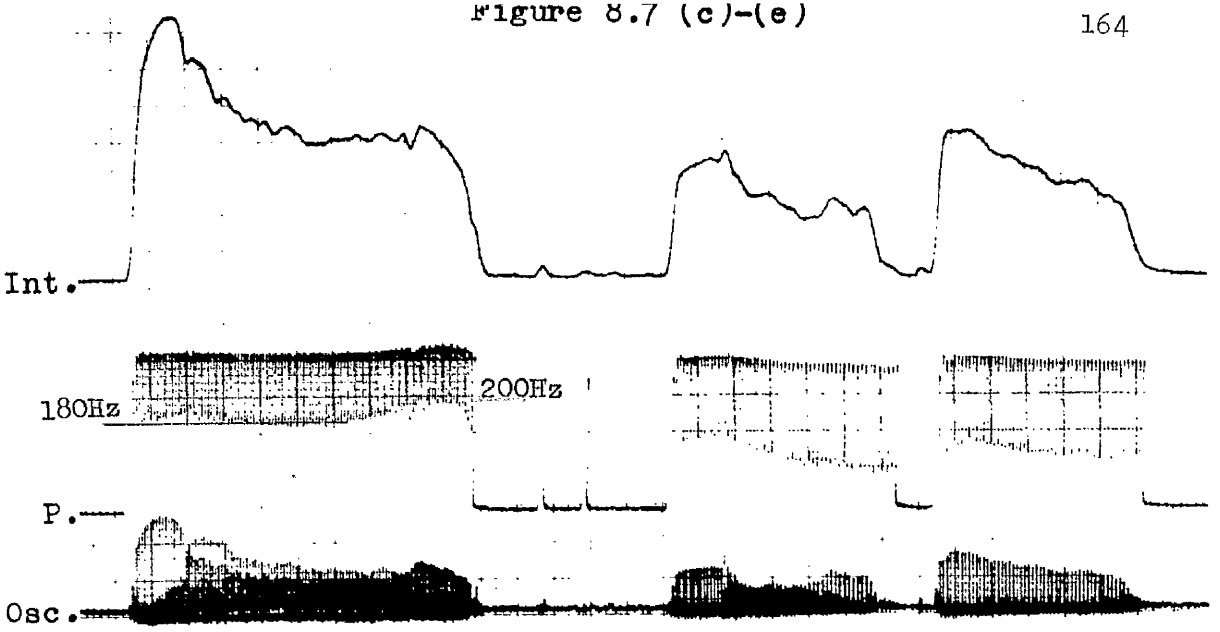
(a) mid : / prun kʰa^{1}ŋ //\phet /

" Too hot, the curry you've made."

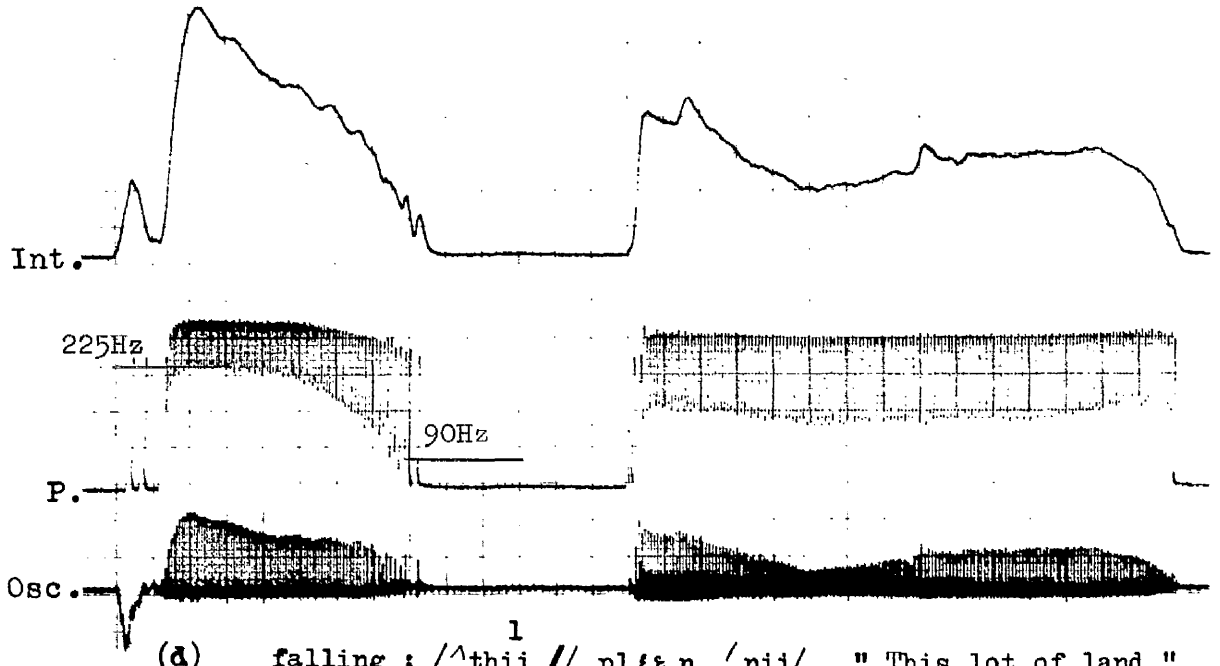


(b) low : / mii \ kʰaaw^{1} // dii/

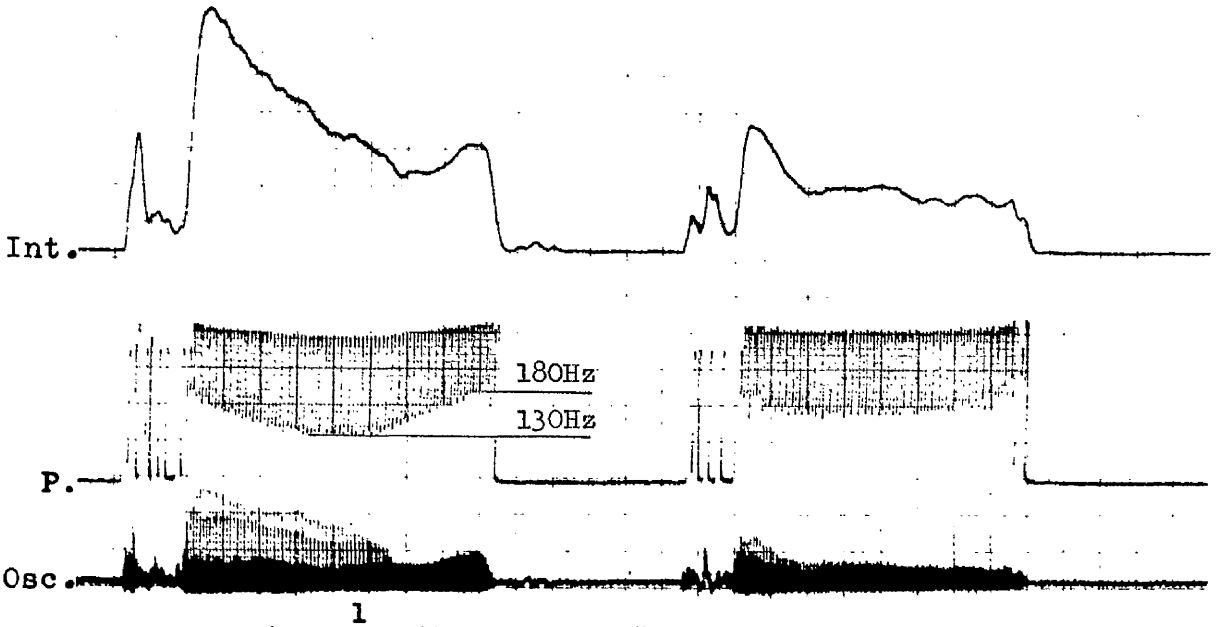
" Good, there is news."



(c) high : / ˊraa^{1}n // ˋmaj dii / " This shop, quite new. "



(d) falling : /^thii^{1} // plɛɛ ŋ ˊnii/ " This lot of land "



(e) rising : / ˇkhɔɔ^{1}ŋ // ˊkhaaŋ / " this stuff, it is left over night."

// = a pause.

6.3. The changes in the pitch contours of unaccented or unstressed syllables have been mentioned by most linguists working on the phonology of Thai. Whitaker[7], from his own and other linguists' findings, has summarized the changes in the following 5 rules . The symbols ∼ and ↔ are used by Whitaker to represent the changability of the tone.

(11)

Rule I: low ∼ mid Applies to unstressed modals and unstressed syllables in derived polysyllabic words.

ˇkhaw ˋtcaʔ paj ↔ ˊkhaw tca paj
"He will go" "He will go"

Rule 2: high ∼ Mid Applies to same as rule 1

ˇsonthanaa ↔ ˇsonthanaa
"conversation" "conversation"

Rule 3: high ∼ fall Applies to sentence final particles

ˋsaʔ baaj dii ˇruuu ˊkha ↔ sa baaj dii ^kha
"How are you?" "Quite well, thanks.(female speaker)"

Rule 4: rise ∼ high Applies to Q morpheme (= question particle) and certain pronouns:

^tchaj ˇmaj ↔ ^tchaj ˊmaj
"Is that right ?" "Is that right?"

ˇkhaw paj ˇruuu ˋplaaw ↔ ˊkhaw paj ˊruuu ˋplaaw
"Is he going, or not ?" "Is he going, or not ?"

Rule 5 fall ∼ high Applies to certain modals (= PreV in this thesis) and neg-morpheme (= negator in this thesis)

ʔaa ˋkaat ^maj ^tchaj ˊrɔɔn ↔ ʔaa ˋkaat ˊmaj ^tchaj ˊrɔɔn
"The weather isn't hot." "The weather isn't hot."

ˇkhaw ^maj ^khɔɔj ˋjaak ˋtcaʔ paj ↔ khaw ˊmaj ˊkhɔɔj ˆjaak tca paj
"He hardly wants to go." "He hardly wants to go."

Whitaker calls these rules "stylistic tone changing rules"; but clearly the change which takes place in Rule 3 is a syntactic change and not a stylistic one; since by changing the tone on the final particle / kha / in the sentence /ˋsaʔ baaj dii ˇruuu ˊkha / from the high tone to a falling tone, we change an interrogative sentence into an answer or a statement. One thing which has been overlooked by Whitaker is the fact

that the syllables in which these tone changes take place are all unaccented or unstressed (only Rule 1 and Rule 2 mention this.). Moreover, the environment for these tone changing rules is much wider than what was stated by Whitaker. Rule 4 for instance, does not apply just to the socalled "Q-morpheme" and certain pronouns; but also in the following unaccented syllables :

(12)

ˇsia ˋʔok ˇsia tcaj ⟷ ˊsia ˋʔok ˊsia tcaj
" to regret"
/ˇsia/ is parts of the reduplicated form of the compound /ˇsia tcaj/ "to regret"

ˋphit ˇmuan kan ⟷ ˋphit ˊmuan kan
" to make some mistakes"
/ˇmuan/ is the nonfinal component of the insti. compound /ˇmuan kan/ adverb

ˇmaaj ˇmaaj ⟷ ˊmaaj ˇmaaj
" intending to"
/ˇmaaj/ is the completely reduplicated form of /ˇmaaj/ " to intend "

tham ˇsia ˋnuaj ---- tham ˊsia ˋnuaj
"He worked until he became tired." /ˇsia/ is a conjunction.

An illustration for this tone change is given in Fig. 8.8 on p. 170: / ˇmaaj ˇmaaj / " intending to ".

As mentioned earlier, Whitaker calls his 5 rules " stylistic tone changing rules". Such rules as will be formulated by the author in this chapter are in fact an amplification of Whitakers rules. The term "stylistic" however has to be redefined. Whitaker's use of the term, as already pointed out, is not purely stylistic if the term is to mean "a change in form without any effect on the meaning". The author will use the term "stylistic" primarily in the sense outlined on p.9, namely in referring to the difference in the tempo of the speech. Thus , since all the rules postulated in this thesis operate only in the context of " Allegretto or faster tempos ", the change of the pitch contours of the unaccented syllables may be viewed as a stylistic change. The term "stylistic" defined in this sense will therefore exclude all other tone changes which involve

a change in either syntax (as in the change from /ˊkha / to /ˆkha / in Whitaker's rule 3 on p.165)or in the speaker's attitude (as in / dii ˋkraʔ maŋ / " It should be alright." into [dii ka: ˊmaŋ] " It might be alright.") In other words, the tone changes in this chapter are the result of the operation of the Accent Placement Rules in the context of colloquial style.

In our analysis of the tone on syllables with [Accent 1] , it is essential that each pitch height of the tone is uniquely assigned to each sonorant segment in the syllable. However, in unaccented syllables, the actual number of the sonorant segments in the syllable bears no relation to the number of pitch height which, as will be seen later, is one only in all cases . This in fact is not as inconsistent as it appears to be; for in unaccented syllables with more than one sonorant segment, namely those with a syllabic followed either a nasal or a glide, the lengths of both the syllabic and the following nasal or glide have been reduced to less than half the lengths they have when the syllable in question bears [Accent 1] .

To effect these pitch changes in unaccented syllables, one may formulate rules which assign a pitch height to the sonorant segment(s) of the unaccented syllable. However, as will be seen later, the pitch height into which each tone changes , is usually one of the pitch heights of that tone. For instance / ˊmaaj / with [Accent 1] in Fig. 8.8. on p. 170 has a rising tone which is specified as $\begin{bmatrix}+\text{lowT}\\-\text{modify}\end{bmatrix}\begin{bmatrix}+\text{lowT}\\-\text{modify}\end{bmatrix}\begin{bmatrix}+\text{highT}\\-\text{modify}\end{bmatrix}$. When this lexical item is unaccented, its pitch hight is $\begin{bmatrix}+\text{highT}\\-\text{modify}\end{bmatrix}$ which is in fact the last pitch height of the rising tone. Thus, one feels that this change into the high pitch is closely connected with the fact that the rising tone already contains this high pitch. The rules which effect the change in pitch height must in some way, capture this generalization. To do this, one may therefore state that the process which takes place in

unaccented syllables is in fact the changes in the pitch heights of that particular tone into one long level pitch ; and then, because of the shortness in the length and the lack of stress in that syllable, the long level pitch is reduced to a short one. Thus, in the case of unaccented /ˇmaaj / , one would need to have a rule which rewrites the feature [+lowT] as [+highT] when the [+lowT] immediately precedes the feature [+ highT] in unaccented syllables. This would specifies the pitch heights of the unaccented /ˇmaaj / as $\begin{bmatrix}+\text{highT}\\-\text{modify}\end{bmatrix}$ $\begin{bmatrix}+\text{highT}\\-\text{modify}\end{bmatrix}$ $\begin{bmatrix}+\text{highT}\\-\text{modify}\end{bmatrix}$. Then there would be another rule which deletes all but one pitch height in the unaccented syllable, thus leaving the pitch height $\begin{bmatrix}+\text{highT}\\-\text{modify}\end{bmatrix}$ for the unaccented /ˇmaaj /.

In the investigation of the changes in the pitch contours in unaccented syllables, an oscillograph, a pitch meter and an intensity meter are linked to the writing instrument " mingograph " which reproduces, as shown in the figures in this chapter, traces which show a) the frequencies of of the segments (oso.), b) the pitch of the sonorant segments (P), and c) the intensity (Int.), of the utterances.(See Appendix on p. 199-200)

Unaccented syllables with the five lexical tones in syllable types :

(13)

C L V $\overset{1}{}$
C L V G_1
C L V (G_1) G_2
C L V (G_1) N
C L V (G_1) S

G_1 = non-syl. V
G_2 = /j/ /w/

from 4 sources, namely a) non-final syllables of polysyllabic words, b) unaccented monosyllabic words, c) the first syllable of institutionalised compounds , and d) the completely reduplicated forms, were analysed. An attempt was made to find 5 items for each type and this should give a total of 5 x 4 x 5 = 100 items for each tone. However, there are two factors which restrict the number of the items one may use, namely (i) the tonal restrictions as stated on p. 14 which mean that certain tones may not occur in certain types of syllable structures, and (ii) the restriction on the use

of items which actually occur in the lexicon. Thus, although / ˊnaŋ / is theoretically possible, it does not occur in the lexicon and so could not be used. The actual number of items analysed is shown in (14)

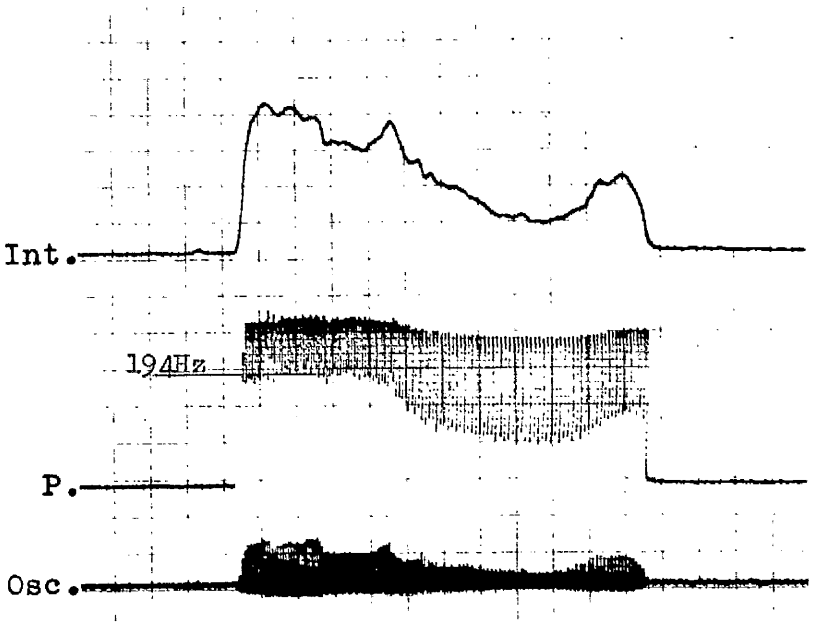
(14)

mid tone	51 items
low tone	71 items
high tone	63 items
falling tone	55 items
rising tone	52 items

The tempo used in the analyses, unless stated otherwise, is Allegretto. All the unaccented syllables occur in non phrase final positions so that interaction with phrase final intonation is eliminated as much as possible.

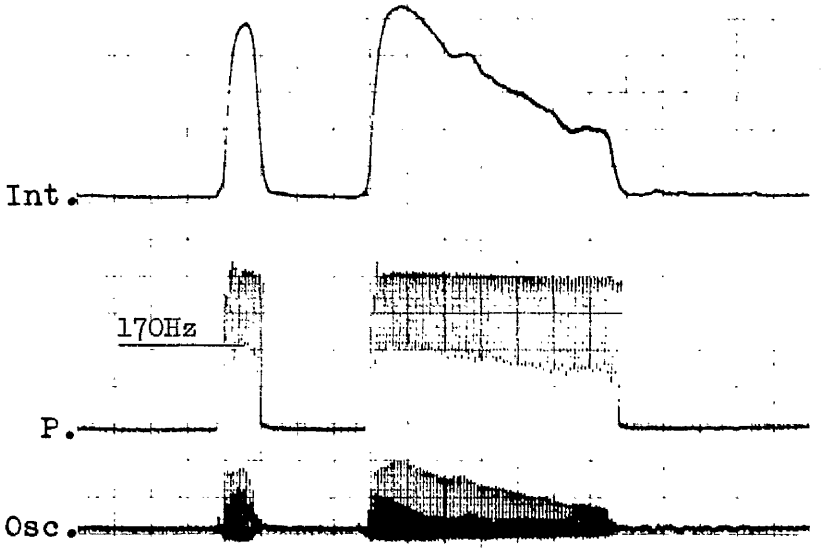
8.3.1. The mid tone.

Fig. 8.9 (a-f) on p. 170 -172, show the pitch contours of unaccented mid toned syllables from various sources. The pitch range of the unaccented mid tone, as shown by the measurements in the graph, varies from 180Hz in /man/ in Fig. 8.9(c) to 140Hz in / kaan/ in Fig. 8.9.(f) on p. 171-2. The determining factor seems to be its position in the utterance. If the syllable occurs near the beginning of a long utterance, there is a tendency for its pitch height to be high, in fact as high as the range for the high tone(see p. 156); whereas if it occurs near the end of the utterance, there is a tendency for its pitch height to be low. The pitch height of / kaan/ in Fig. 8.9.(f), on p. 172, / tham kaan ^baan / " to do one's homework." comes to 140 Hz, which a a borderline, in our chart on p. 156, between the regions of the mid tone and the modified low tone. One may view the pitch variations in , not only the unaccented mid tone but , as will be seen later in all the unaccented tones, as this phonomenon is common

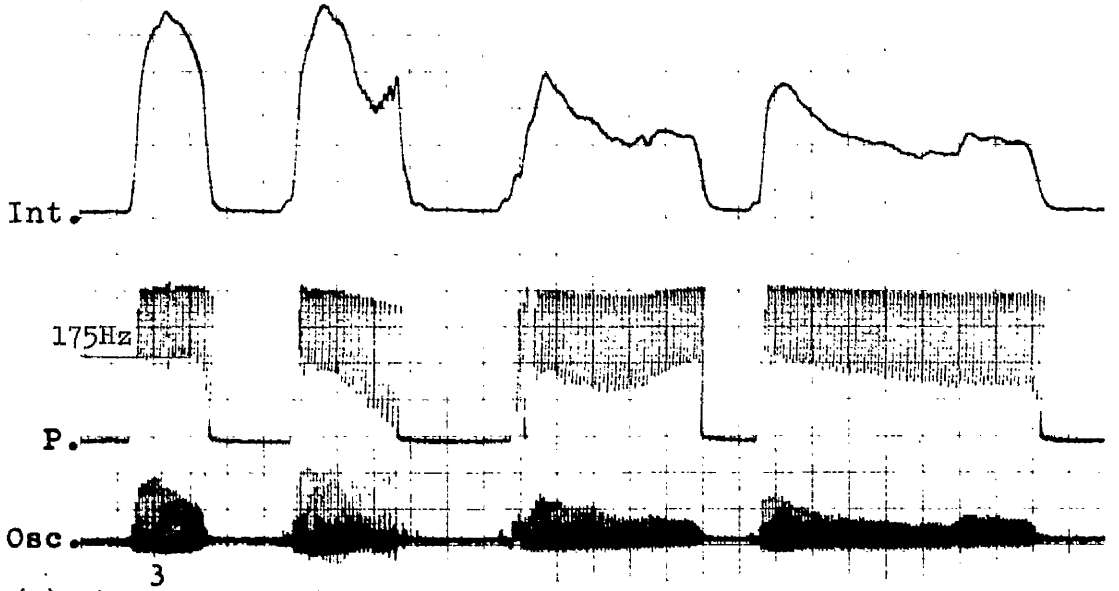


(a) /˅^{3}maaj ˅^{1}maaj/ " intending to "

Figure 8.9. (a) & (b)
Pitch contours of unaccented mid tone.

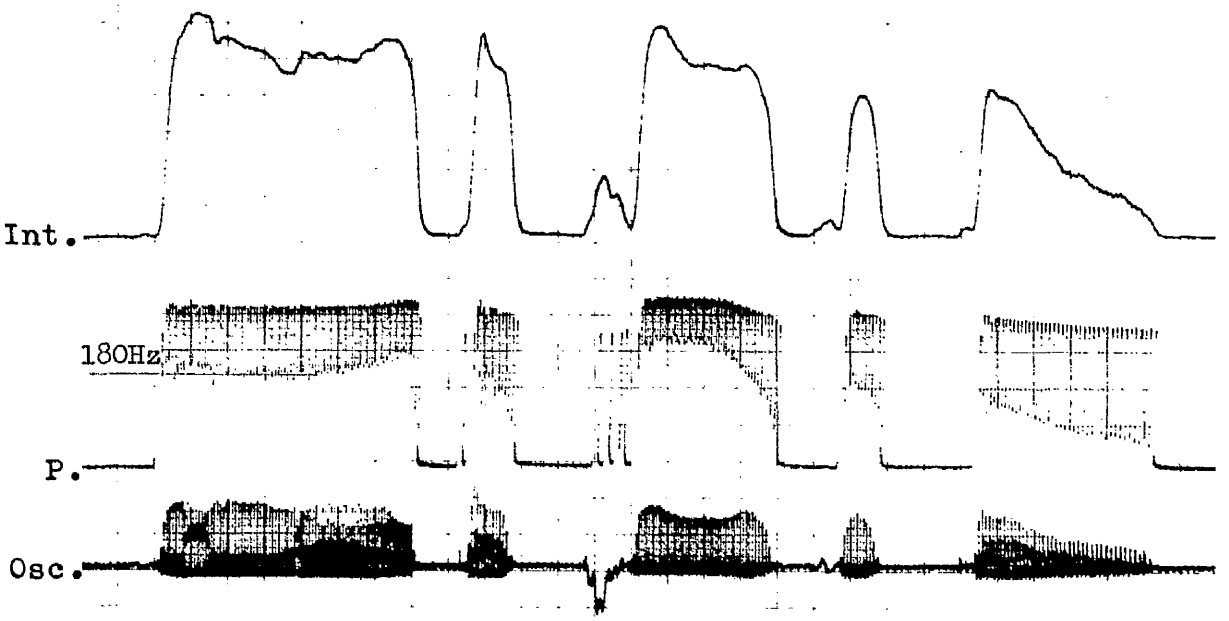


(a) / taa puu/ " a nail "



(b) / maa ˋka? ˅phɛɛn kaan/ " Come to make a defensive plan."

Figure 8.9 (c) & (d)



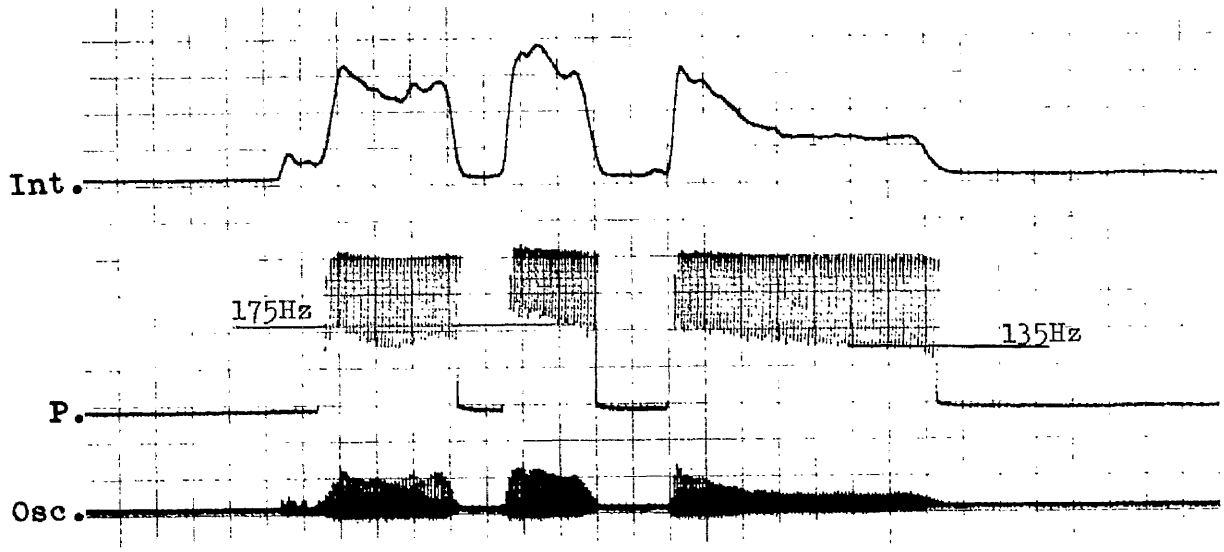
(c) /man ˊlɛɛw ˋtɛɛ ˆthii ˆthii ˋkɣɣt /

" It depends on the place one was born. "

(d) /ˇluaŋ tɕaaŋ tɕaaŋ /

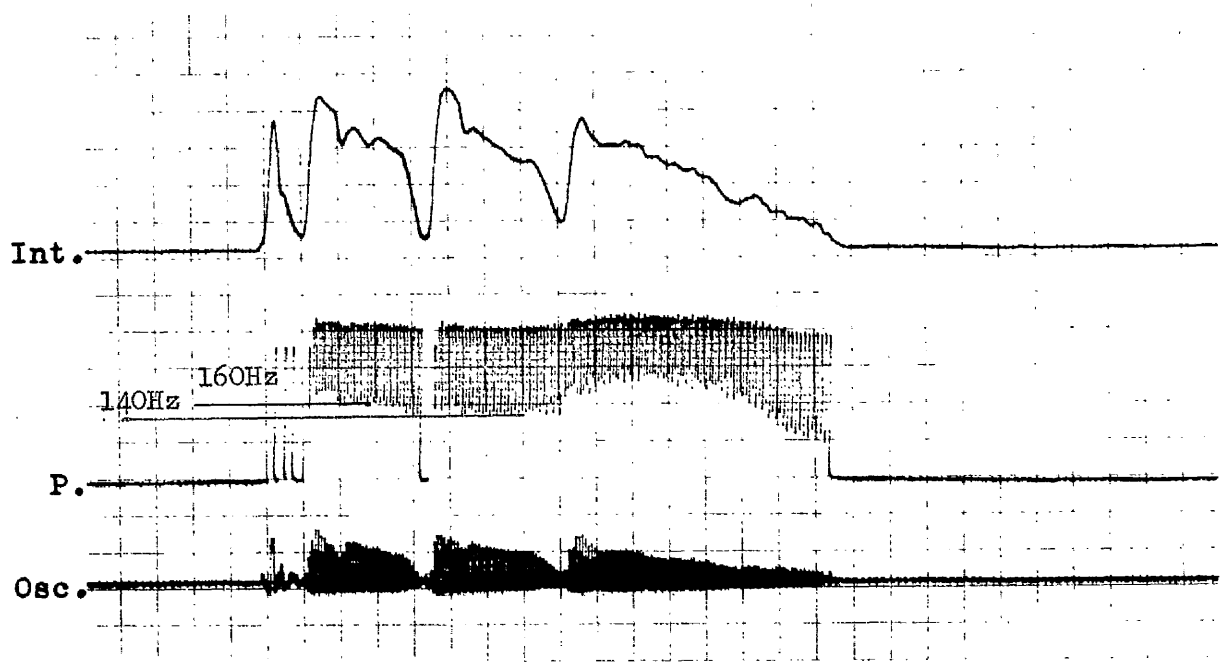
" fairly pale yellow "

Figure 8.9 (e) & (f)



(e) / ˇkhaj kun tcɛɛ /
3

" Open with a key."



(f) / tham kaan ^baan /
3

" to do one's homework "

for all tones) as a superimposition of sentence intonation. E.J.A. Henderson has summarized the effect of the intonation on the lexical tones, accented or unaccented, as follows [8] :

> " In rapid combinative style, it is possible to detect certain intonational tendencies which may be mentioned here. A sequence of mid level tones tends to be pronounced on a descending scale, with a fairly marked fall in pitch in the last syllable before a pause. A fall in pitch may be postponed until a word of sufficient semantic import is reached. The words preceding or following an important fall in pitch may, if their content allows it, be pronounced as a fairly low pitch, even if their lexical tone is not low level."

Since the effect of the sentence intonation is on both accented and unaccented mid tone (compare the pitch of / tham / (=160Hz) in Fig.8.9f with the pitch of / tɔɔ / (=135Hz) in Fig. 8.9e on p172), it seems that the pitch of the unaccented mid toned syllables is in fact a short version of the mid tone. It seems therefore justified to have a rule as in (15)

(15)

$$\begin{bmatrix}-\text{highT}\\-\text{lowT}\end{bmatrix} \longrightarrow \emptyset \;/\; \begin{bmatrix}-\text{highT}\\-\text{lowT}\end{bmatrix}\_\_\_\_\_ \text{ in unaccented syllables}$$

(15) states that a pitch which is $\begin{bmatrix}-\text{highT}\\-\text{lowT}\end{bmatrix}$ and which follows immediately another pitch height which is also $\begin{bmatrix}-\text{highT}\\-\text{lowT}\end{bmatrix}$ is deleted if the syllable in question is unaccented. In syllables with three pitch heights as in / kaan / which may be specified as $\underset{1}{\begin{bmatrix}-\text{highT}\\-\text{lowT}\end{bmatrix}}$ $\underset{2}{\begin{bmatrix}-\text{highT}\\-\text{lowT}\end{bmatrix}}$ $\underset{3}{\begin{bmatrix}-\text{highT}\\-\text{lowT}\end{bmatrix}}$, the second pitch height is first deleted by the rule in (15). This brings the third pitch height immediately after the first pitch height and thus provides another environment for an operation of the second cycle of (15) which then deletes what was originally the third pitch height, leaving only one pitch height namely $\begin{bmatrix}-\text{highT}\\-\text{lowT}\end{bmatrix}$ for the unaccented / kaan /.

8.3.2. The low tone.

Fig.8.10(a-h) on p. 175-177 show the pitch contours of unaccented low toned syllables from various sources. It seems that the unaccented low tone has two pitch contours. The first is a short mid level pitch which is the same as those generated by rule(15) in p. 173. The second contour is that of a short modified low tone which ranges in pitch from 130Hz to 140Hz (see (10A) on p.156). The change from the low tone to a mid level pitch height takes place in two environments, namely (i) in a unaccented monosyllabic word with a short vowel followed by a glottal stop and (ii) in the same type of syllables which are non final in poly syllabic words. Illustrations of the first environment are shown in Fig8.10c : /ˋtcaʔ paj /(=180Hz) and Fig.8.10d /ˇhen ˋkaʔ ˇkhaw/(=190Hz). An illustration of the change in the second environment is shown in Fig.8.10a : /ˇkhaw ˋsaʔ ˋnit kan/ (=205Hz) while Fig.8.10b shows the effect of the sentence intonation on the pitch height of /ˋsaʔ/(=160Hz) when this syllable occurs near the end of the utterance, resulting in the lowering of the pitch height. All other unaccented low toned syllables which do not have the (a) and the (b) environments in rule (16) below, will have a short modified [lowT]. Their illustrations are shown in Fig.8.10e /ˋjaa / (=140Hz), Fig.8.10f :/ ˋklop/ (=140Hz) Fig.8.10f : / ˋprɔʔ/ (=137Hz) and Fig.8.10g : /ˋtaaŋ/ (=130Hz). These changes in pitch heights of the unaccented lexical low toned syllables may be stated by the following rules in (16):

(16)

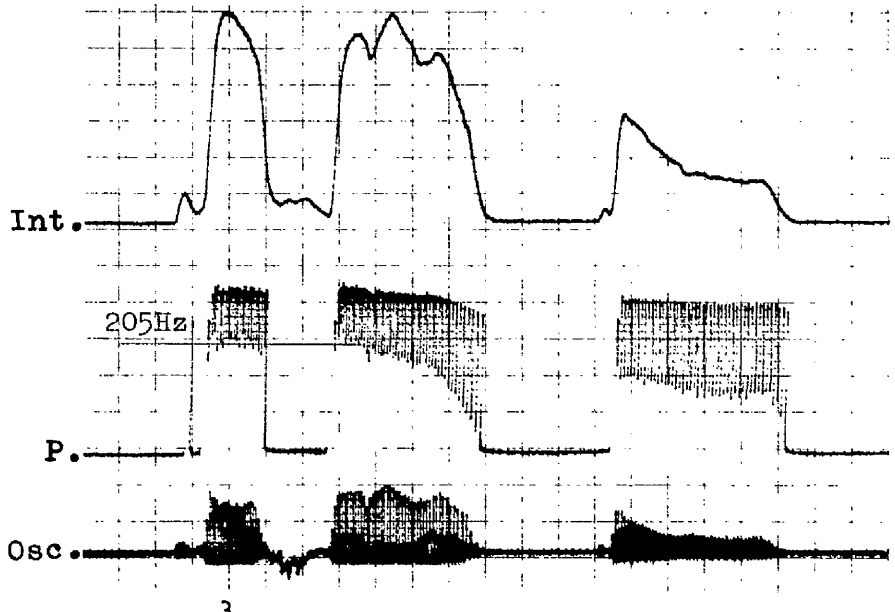
$$[+\text{lowT}] \longrightarrow \begin{cases} [-\text{lowT}] \;/\; \begin{cases} \# C(L) \overline{\underset{[\text{Accntn}]}{V}} \begin{bmatrix} -\text{cons} \\ -\text{son} \end{bmatrix} \; \# & \text{(a)} \\ \# C(L) \overline{\underset{[\text{Accntn}]}{V}} \begin{bmatrix} -\text{cons} \\ -\text{son} \end{bmatrix} \left(XY \; V \begin{bmatrix} -\text{cons} \\ -\text{son} \end{bmatrix} \right)^{*} Wz \; \underset{[\text{Accntl}]}{V} \; \# & \text{(b)} \end{cases} \\ [+\text{modify}] \;/\; \left[\overline{\underset{\text{Accntn}}{V}} \right] \begin{bmatrix} -\text{cons} \\ -\text{son} \end{bmatrix} & \text{(c)} \end{cases}$$

where $n \leq 3+$

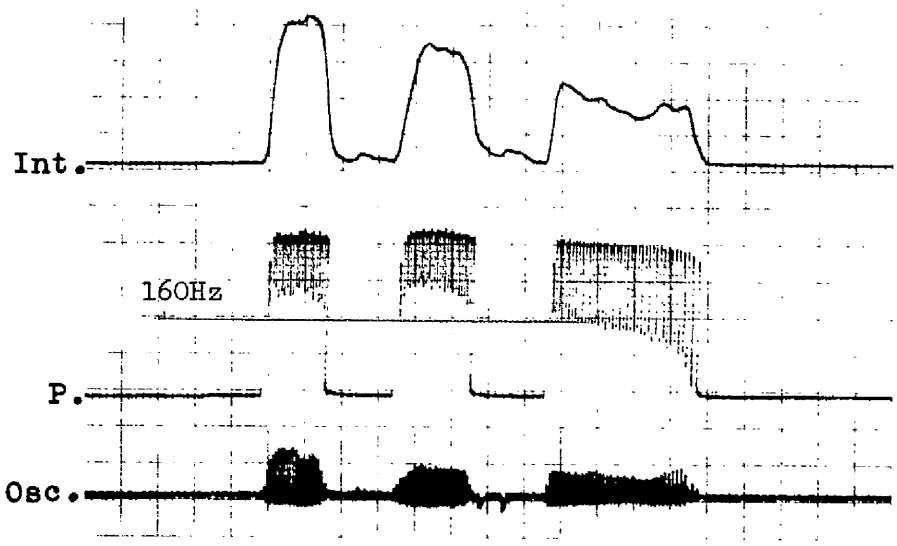
Rules (16a) and (16b) are in fact the same as Whitaker's Rule I reproduced on p. 165. Incidentally, in Fig. 8.10g /ˋprɔʔ ˋprɔʔ / does not have the environment of (16b) since this reduplicated word should have been analysed as :

Figure 8.10 (a)-(c)

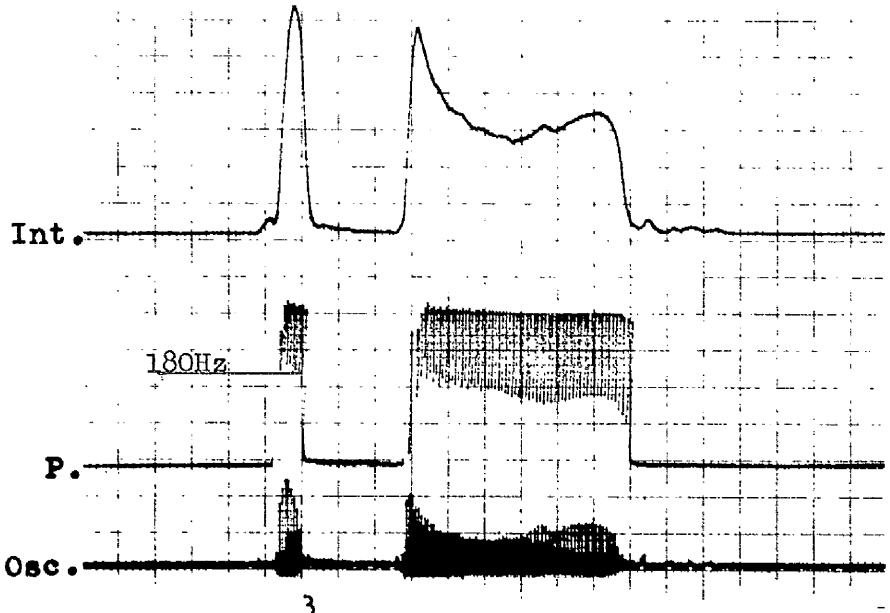
Pitch contours of the unaccented low tone.



(a) /ˇkhaw ˋsa? ˋnit kan / " They are very close friends. "

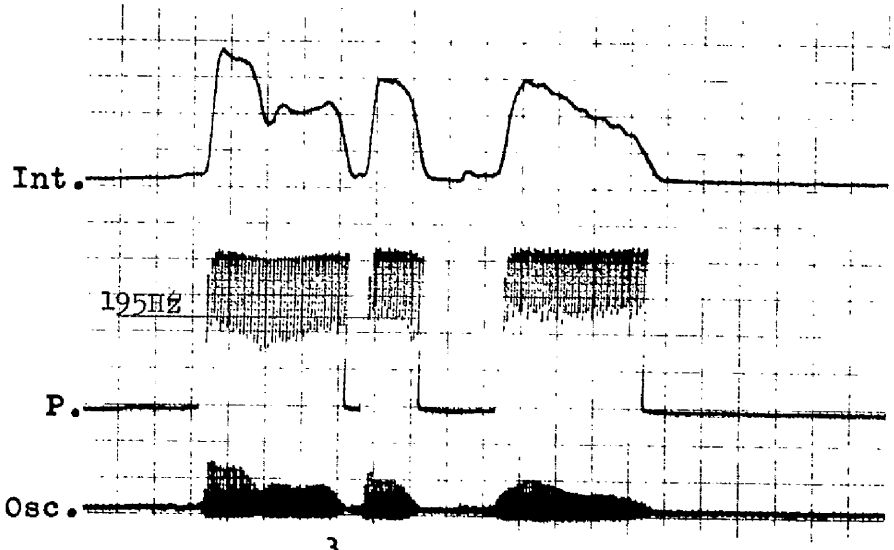


(b) /^maj ^ khɔɔj ˋsa? ˋnit / " I don't know him (her) well enough. "

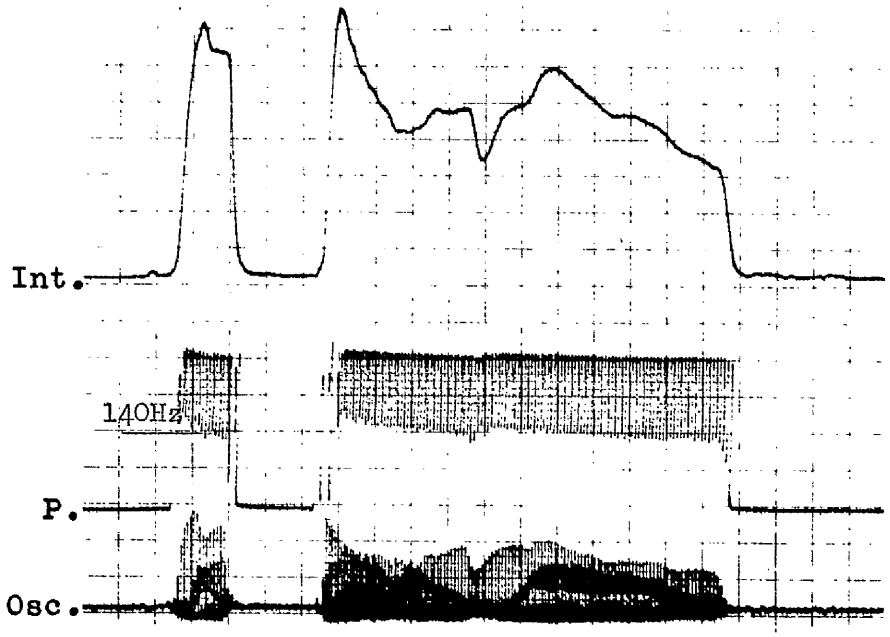


(c) / ˋtɕa? paj / "I want to go . "

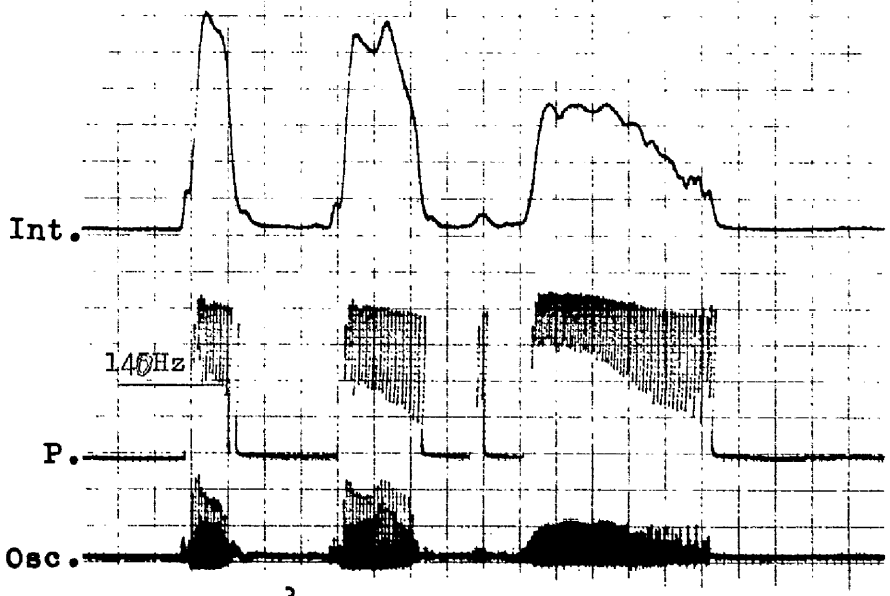
Figure 8.10 (d)-(f)



3
(d) /ˇhen ˋka? ˇkhaw / " Think of him ! "

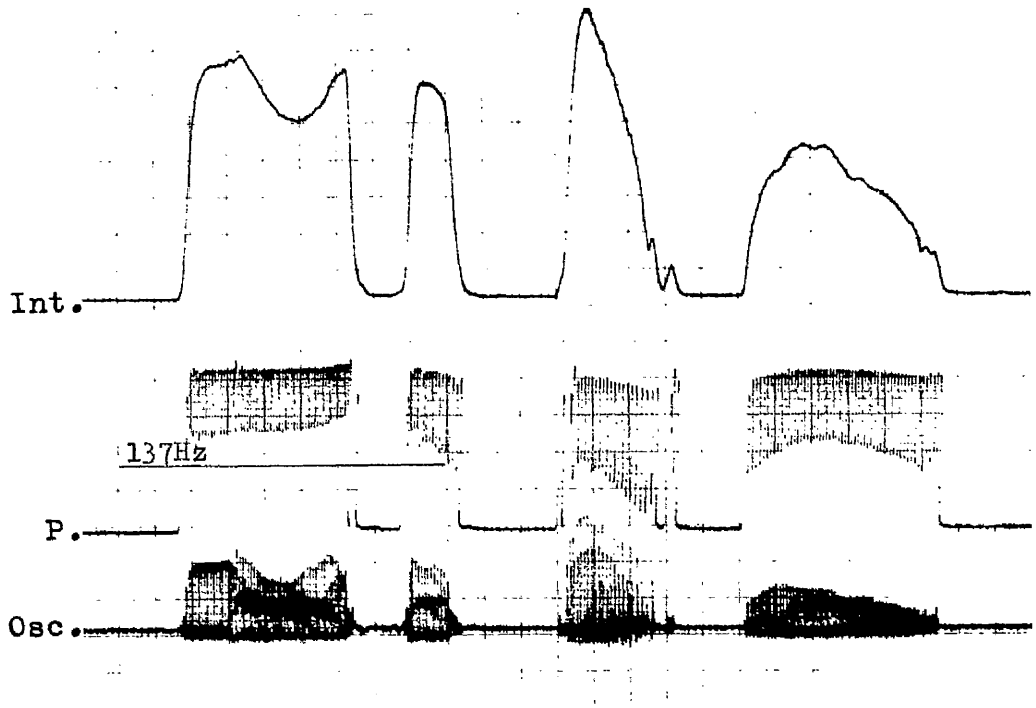


3
(e) / ˋjaa paj lɣɣj / " Do not go! "



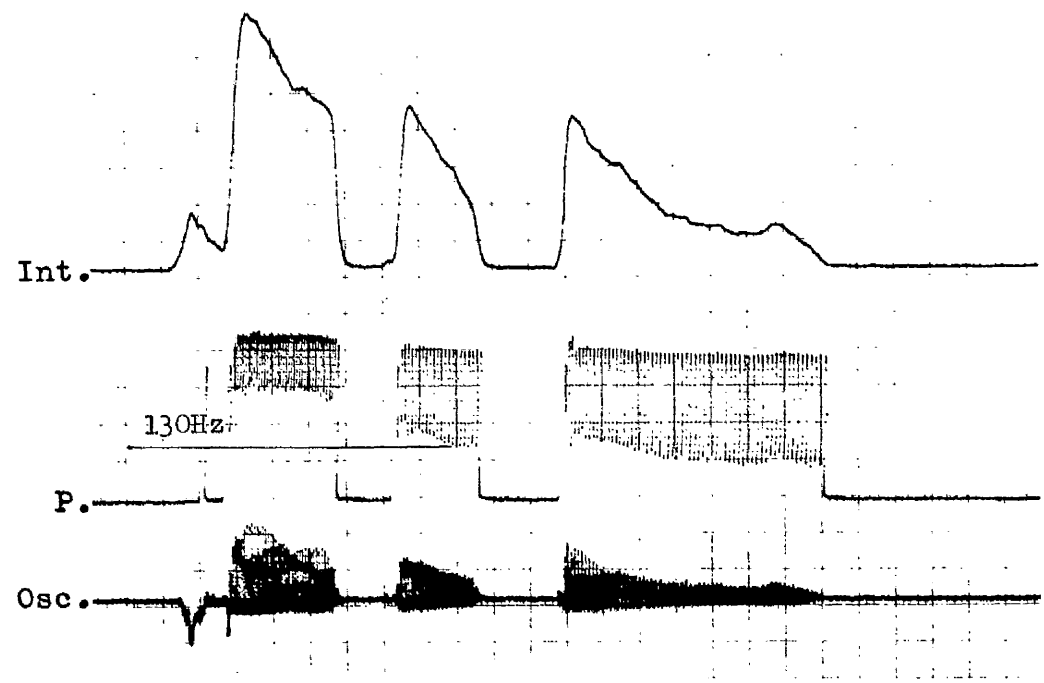
3
(f) / ˋklop ˋklop ^haj ˋmot / " Cover it up! "

Figure 8.10 (g) & (h)



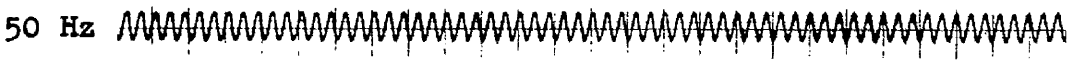
(g)/ ˊmaajˋproˋ ʔˋproˋ ʔ^niiˊ /

"This rotten piece of wood !"



(h) / ^tchaat ˋtaaŋ ˋtaaŋ /
3

" Every nation "



[Vi # ˈprɔʔ [Vi # ˈprɔʔ #] Vi #] Vi . Thus the word boundary after the completely reduplicated form will block the operation of (16b). The utterance therefore has the environment for the operation of (16c) and thus has the pitch of the unaccented /ˈprɔʔ / changed from the low tone to a modified low tone.

After the changes in pitch heights by the operation of (16) we then need another rule which, where relevant, would delete all but one pitch height in unaccented syllables with the low tone. Such a rule would be very similar to rule in (15). The only difference is the pitch height. One may therefore modify (15) to (17) so that one may have just the one rule for the deletion of all but one pitch height in unaccented syllables :

(17)

$$\begin{bmatrix} \alpha\ \text{highT} \\ \beta\ \text{lowT} \\ \gamma\ \text{modify} \end{bmatrix} \longrightarrow \emptyset \Big/ \begin{bmatrix} \alpha\ \text{highT} \\ \beta\ \text{lowT} \\ \gamma\ \text{modify} \end{bmatrix} \_\_\_\_ \text{ in unaccented syllables}$$

(17) simply states that pitch height X is deleted if it immediately follows another pitch height X in unaccented syllables.

8.3.3. The high tone.

In unaccented syllables with the high tone on a single vowel which is followed by a glottal stop, there is a change in the pitch height from [+ highT] to [-highT], or, in other words, a change from a high to a mid pitch, as may be seen in the pitch contour of //laʔ // (=175Hz) in /ˈlaʔ khɔɔn/ in Fig. 8.11a on p. 190 . In other types of unaccented high toned syllables, their pitch contours is a short high level pitch as may be seen in Fig. 8.11 b-c on p. 190 (=215Hz and 190Hz) . This change may be stated in (18)

(18)

$$[+\text{high T}] \rightarrow [-\text{highT}] \Big/ \left[\frac{\quad}{\text{V}_{\text{Accent}}} \right] \begin{bmatrix} -\text{cons} \\ -\text{son} \end{bmatrix} \quad \text{where } n \geq 3$$

= proper N

Rule (17) then operates on the output of rule (18) so that where it is relevant, a long level pitch contour is reduced to a short level contour.

There is however, one exception to rule (18b) : proper names which contain a high toned syllable with a single vowel followed by a glottal stop, and which are loanwords from either Sanskrit or Pali, such as */ˊwiʔ naj/* , */ˊphiʔ ˊnit/* and */ ˋsuʔ ˊniʔ ˇsaa /*. The pitch of these syllables is a high pitch and not a mid pitch as stated by rule (18b). One may not use the feature [+foreign] to be entered with these words in order to block the operation of (18b); since the same loanwords, when function as lexical words such as / ˊwiʔ naj dii / " well disciplined", have their pitch changed by (18b). Since these items fall into one class, namely : proper names; and since none of the native proper names has this type of word structure[9]; it seems reasonable to postulate a feature [+ proper name] to be assigned to these items . The feature [+proper name] will then block the operation of (18b) with the result that these items are subject to (18c) with no change in the pitch height. Or alternatively, one may have, for the sake of clarity, a separate rule which deals with this class of exception. Such a rule is stated in (19)

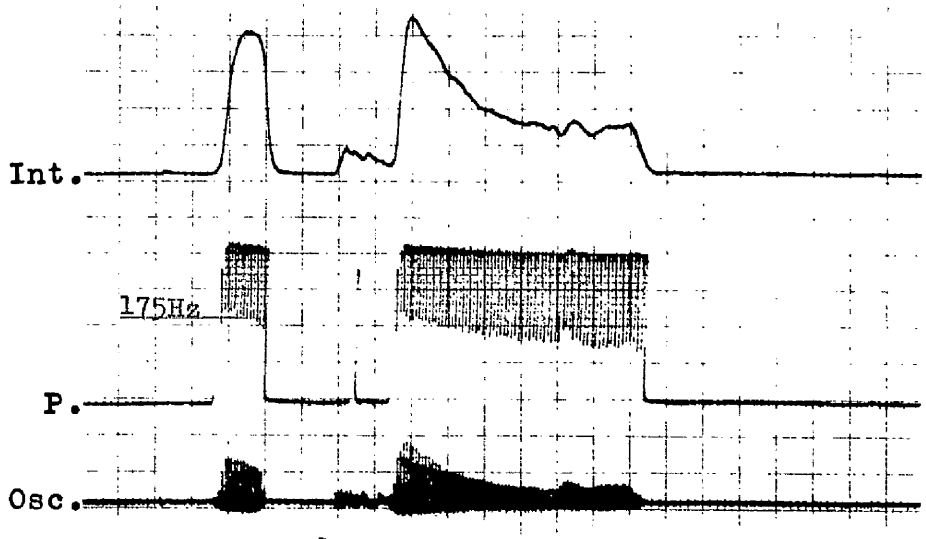
(19)

$$\begin{bmatrix}+\text{highT}\\ +\text{proper name}\end{bmatrix} \longrightarrow [-\text{highT}] \Big/ \#\ \underset{\text{Acute}}{\text{V}} \begin{bmatrix}-\text{cons}\\ -\text{son}\end{bmatrix}_{n} \quad \text{where } n \leq 3$$

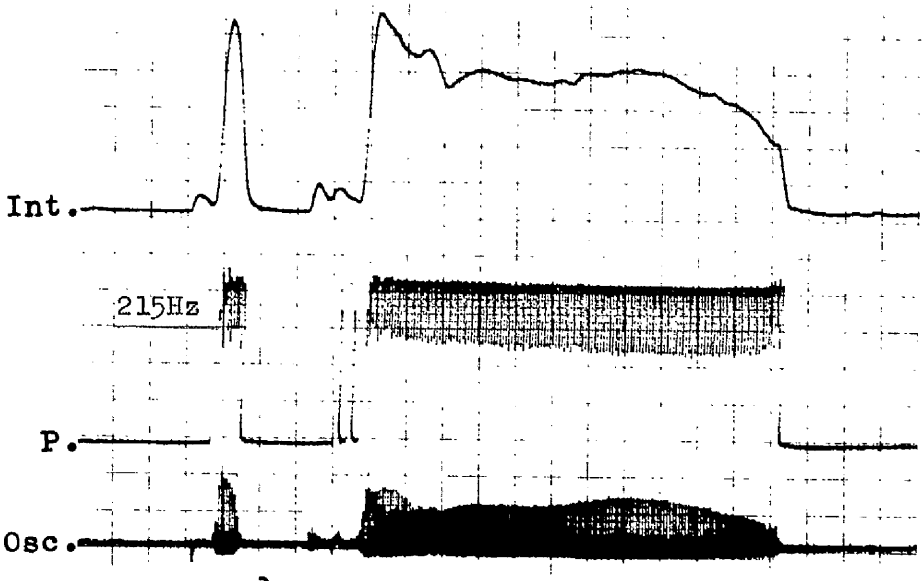
Incorporated already in (18)

Figure 8.11 (a)-(c)

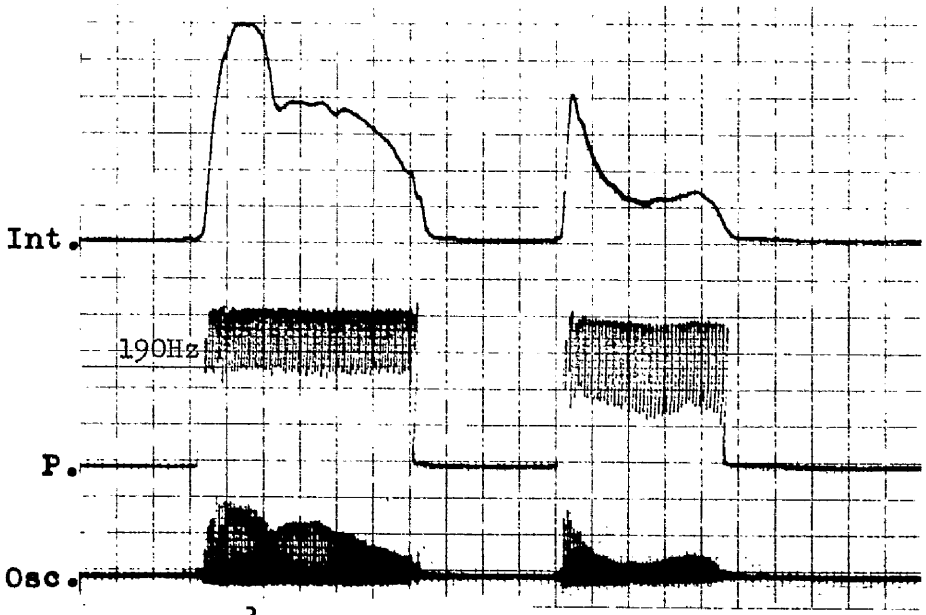
Pitch contours of the unaccented high tone.



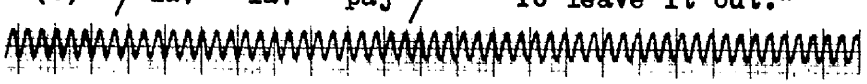
(a) "/la^{3}? khɔɔn/ " A play, drama."



(b) //'thuk 'khraŋ 'nii^{3}/ " Everytime."



(c) /'la^{3}? 'la? paj / " To leave it out."



8.3.4. The falling tone.

The pitch contours of the unaccented falling toned syllables from various sources are shown in Fig.8.12 on p.182 - 184 . In all cases, the pitch contour in question is a short high level pitch . This change may be stated by rule (20)

(20)

[+lowT] ----> [+ highT] / [+highT] _____ in unaccented syllables

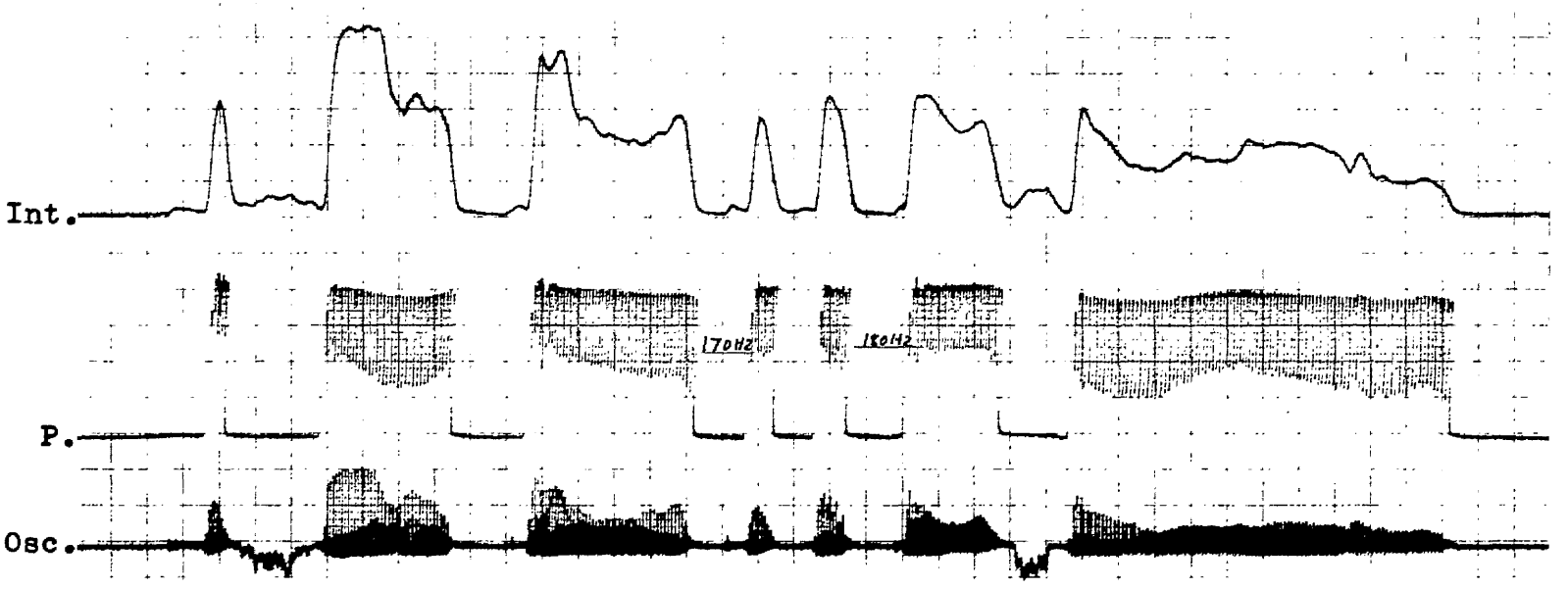
Rule (20) would give the instruction that the last pitch height of an unaccented falling toned syllable, which is [+ lowT] will be rewritten as [+highT] . The pitch contour of the unaccented syllable thus becomes a long level high pitch which is then reduced to a short high pitch by rule (17) .

Fig. 8.12e and Fig.8.12f (on p.184) illustrate that the pitch contours of unaccented falling toned syllables from different sources are in fact identical. # ^maj # " not" (in Fig. 8.12e (=180Hz)) is a negator and is unaccented by APR IIb (see p. 88) while /^maj / in Fig. 8.12f (180Hz) is the completely reduplicated form of # ^maj # "to burn" and is thus unaccented by APR IVa and APR III (see p.88). The pitch contour , in both cases, is a short high pitch.

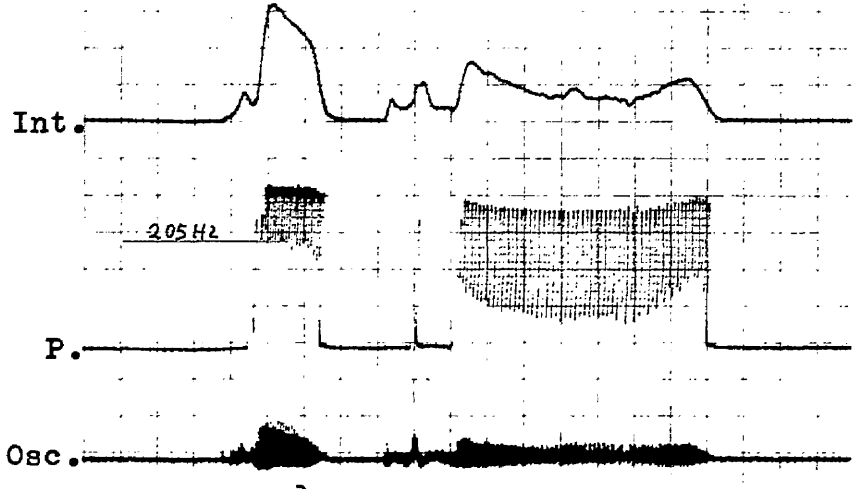
Only one disyllabic word which contains an unaccented falling toned syllable has been found : /^kaw^?ii / "a chair"" . The falling tone in /^kaw/ remains a falling tone. The phonological shape of this lexical item, however, looks suspiciously Chinese in origin and this may accout for its being an exception to rule (20) above. One may block the operation of (20) on /^kaw^?ii / by entering it in the lexicon with the feature [+foreign] to show that it belongs to a different set of rule.

In Fig.8.12 b,c, and d, one notices a final drop in pitch in the syllables concerned. This final drop has been discarded since it is likely to have been caused by the sudden change in the state of the glottis from voicing to the lack of voicing in the transition from a sonorant to a nonsonorant

Pitch contours of the unaccented falling tone.



(a) / ˅khaw ˅sia tɕaj ^thii^{3} ˋtɕa? ^tɔŋ^{3} ˅sia ŋɣɣn / " He was sorry to have to part with his money."

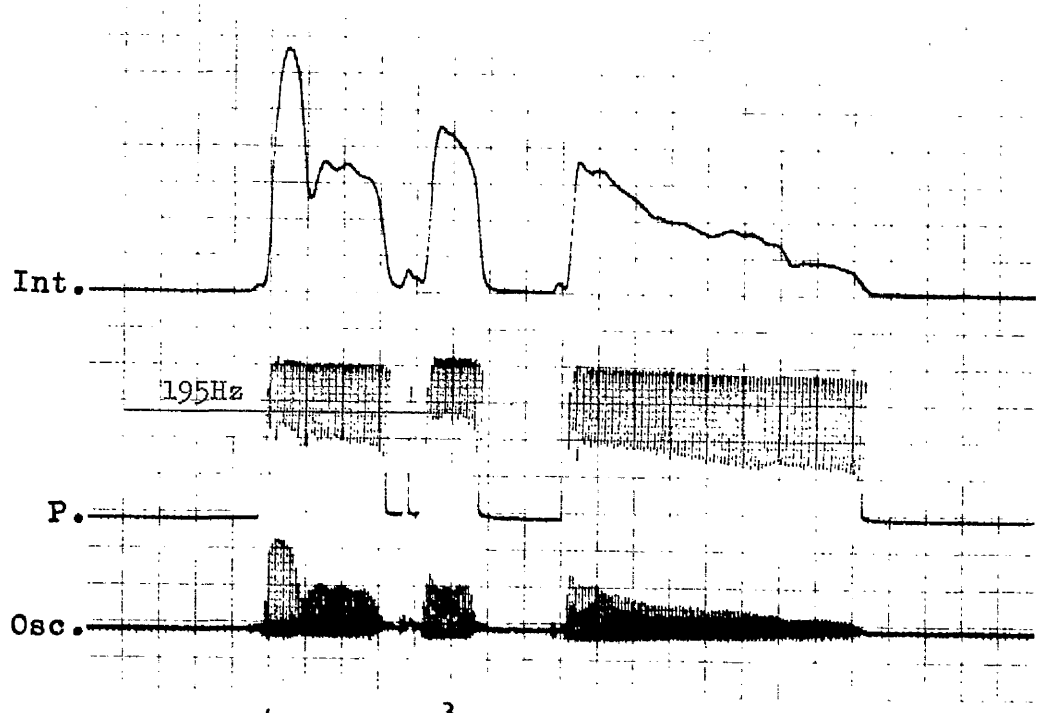


(b) / ^phaa^{3} ˅khaaw / " white cloth."

50 Hz

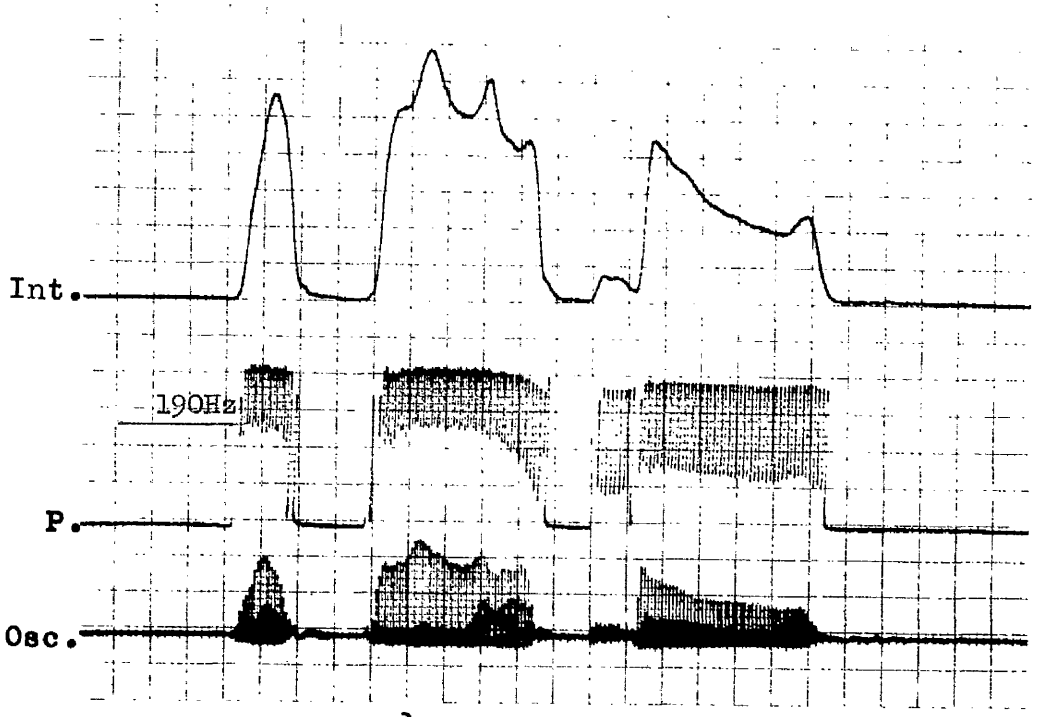
Figure 8.12 (a) & (b)

Figure 8.12 (c) & (d)



(c) / kin ^khaaw^{3} keeŋ /

" To eat a meal (rice with curry)."

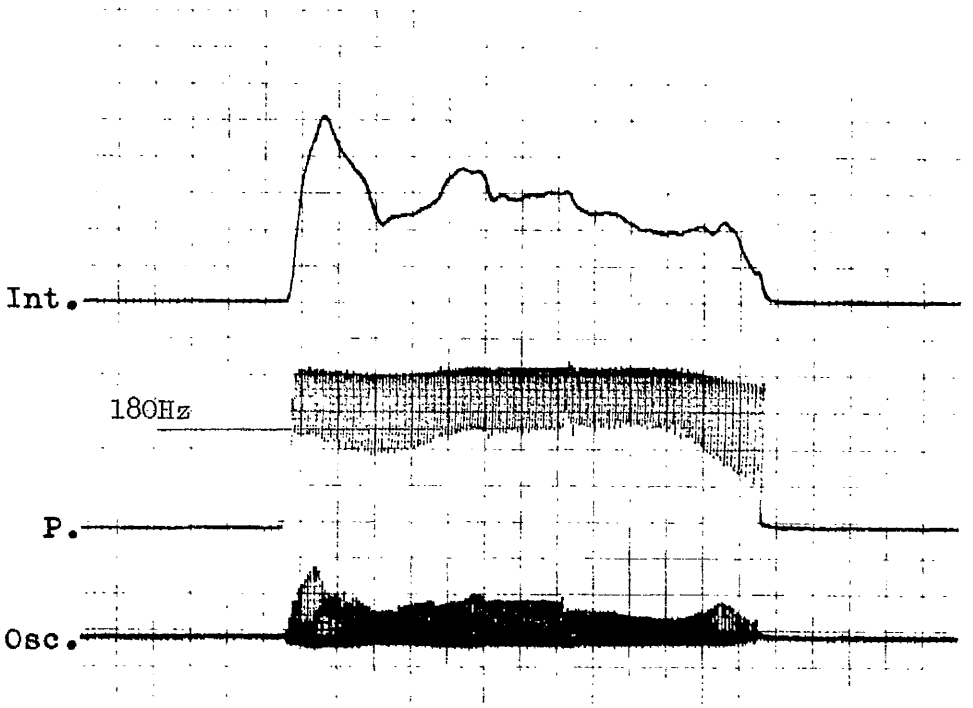


(d) /^ruap^{3} ^ruap duu /

" To collect it together."

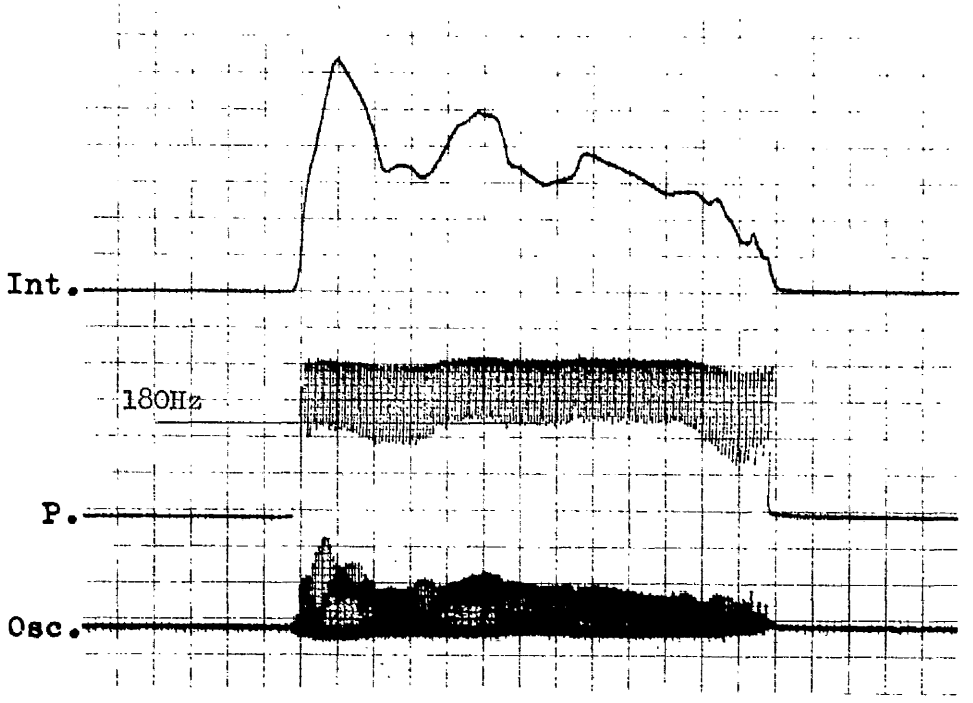
50 Hz

Figure 8.12 (e) & (f)



(e) / jaŋ ˆ maj ˆmaj „

" It is'nt all that burnt."



(f) / jaŋ ˆ maj ˆmaj /

It is still burning. "

8.3.5. The rising tone.

The pitch contours of unaccented rising toned syllables, as shown in Fig.8.13(a-h), (on pp. 186-188) give a rather complex picture. It seems that there are two pitch contours for the unaccented rising toned syllables. One for the completely reduplicated form of lexical item, and for non final syllables in polysyllabic word, with a voiceless initial consonant e.g. Fig 8.13(f): / pen ˅faa ˅faa paj /(=140Hz), Fig.8.13(g) / taa˅ khaaw˅ khaaw /(140Hz) and Fig.8.13(d) / pleeŋ ˅saa kon/(135Hz). The pitch contour is question is that of a short modified low level. The other contour is that of a high level pitch (180Hz or over) as shown in Fig.8.13 (a),(b),(c),(e) and (h). This contour occurs on unaccented rising tone syllables other than those which have the first pitch contour (which is a modified low level pitch.)

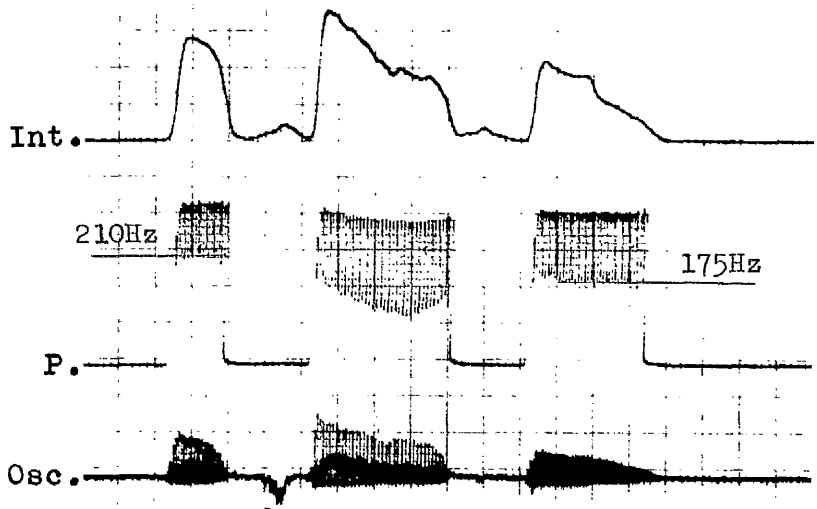
Our problem here is to find if one can view these two pitch contours as variations of the same pitch contour or (ii) to treat them as different pitch contours. It seems that one has to reject the first proposal since acoustically the two pitch contours are different. The first pitch contour lies between the mid and the low region while the second pitch contour lies in the high region. Moreover, one cannot explain their difference in pitch heights in terms of the surrounding segments since by Woo's Convention I on p. 151 in this thesis, the presence of the voiceless segment which precedes the first pitch contour (/f/ is /˅faa ˅faa / for instance,) should raise, the pitch, not lowered it.[10] It seems that one has to recognize the two pitch contours : one = modified low level, the other = high level) as being the pitch contours of unaccented rising toned syllables in different environments. These changes may be stated by the following rules in (21), (22) and (23) :

(21)

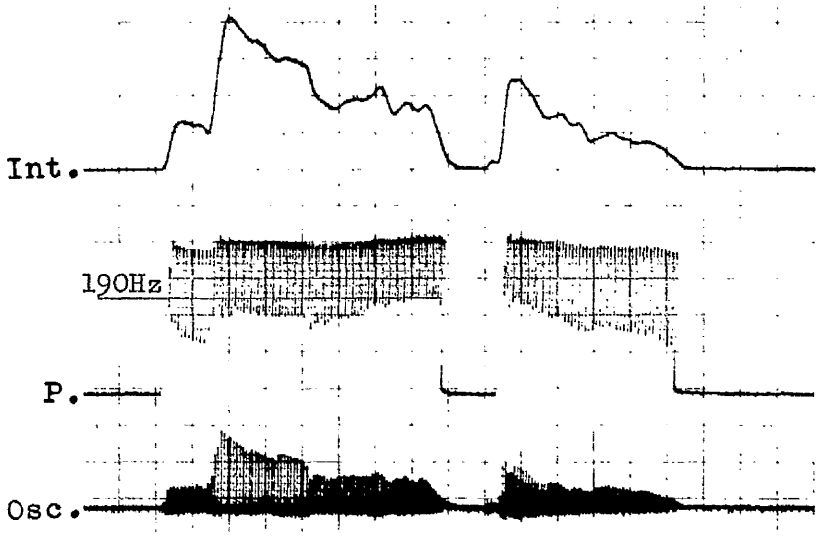
$$[+highT] \longrightarrow [+lowT] \Big/ \begin{cases} \#\ [-voiced]\ [+lowT]\_\_\_\ X\ Y\ \underset{[Accent\ 1]}{V}\ \# & (a) \\ \bullet\ [-voiced]\ [+lowT]\_\_\_\ \text{in completely redulicated forms} & (b) \end{cases}$$

Figure 8.13 (a)-(c)

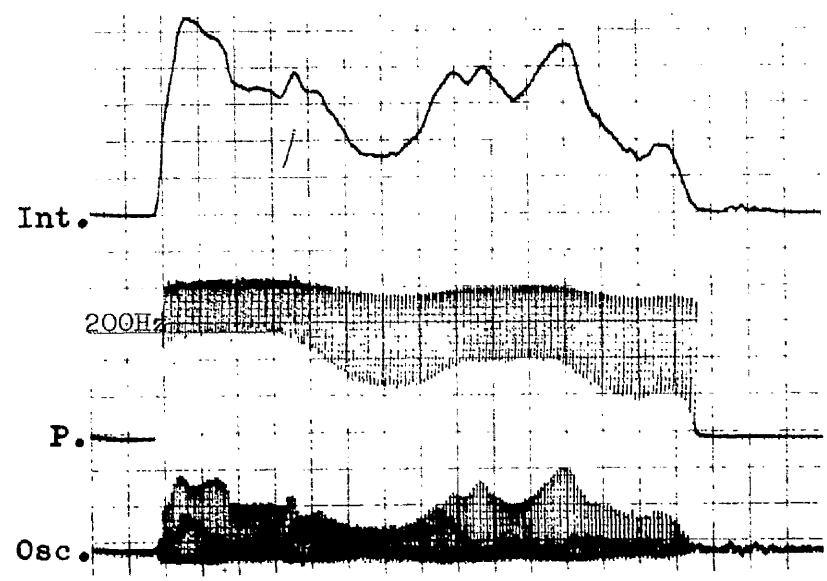
Pitch contours of the unaccented rising tone.



(a) /˅nan^{3} ˅suuu ˅tchan^{3} / " My book."



(b) / dii ˅muan^{3} kan / " Perhaps, it's better. "



(c) /˅naaw^{3} ˅naaw juu/

" I'm cold."

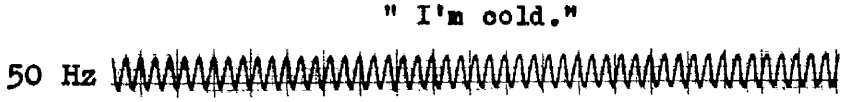
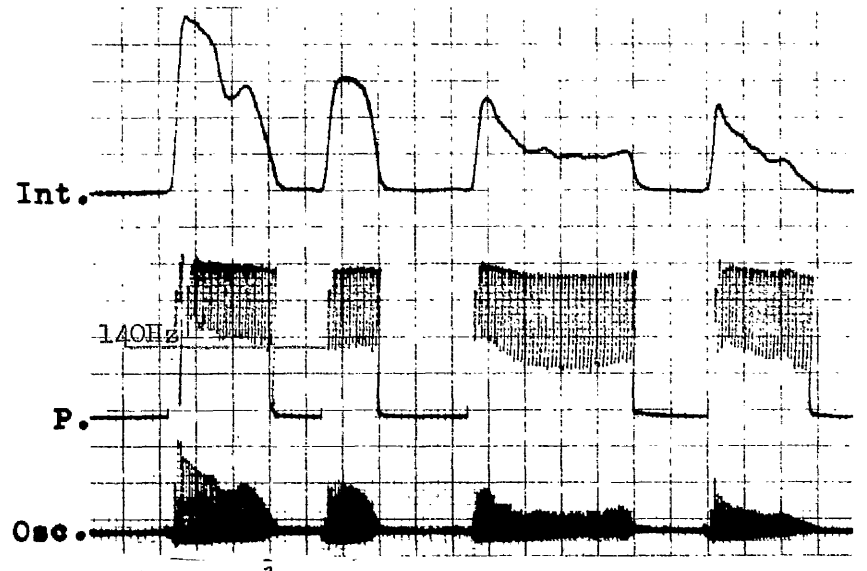


Figure 8.13 (d)-(f)

(d) / pleen ˇsaa kon / " Westernized music."

(e) / ɓaa ˇkhaw ˇkhaaw/ " His eyes are white."



(f) / pen ˇfaa ˇfaa paj/ " For each wall."

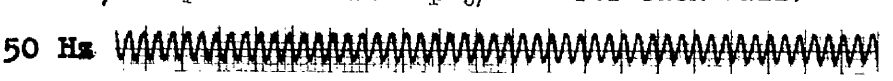
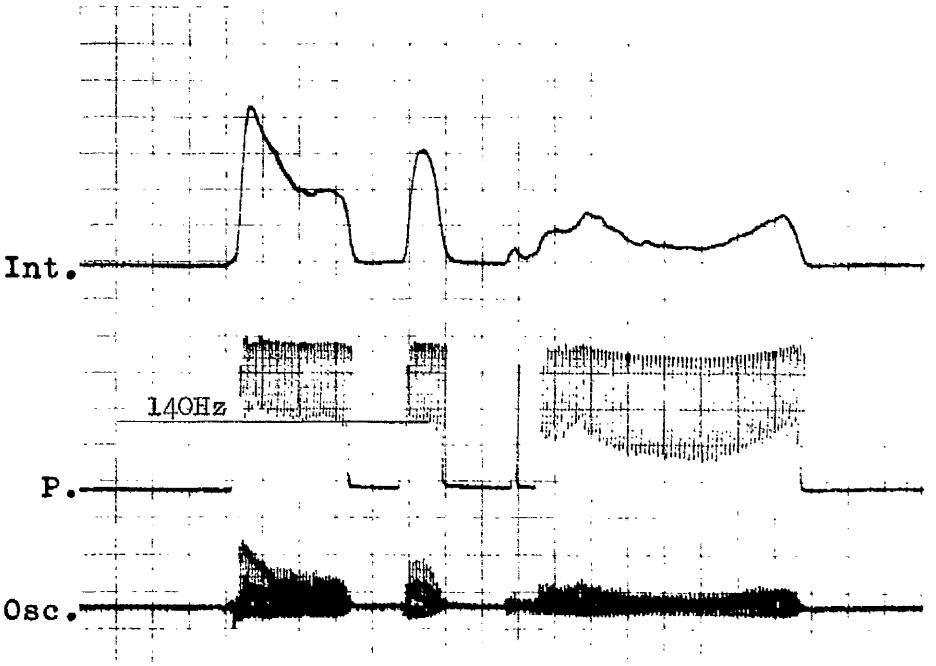
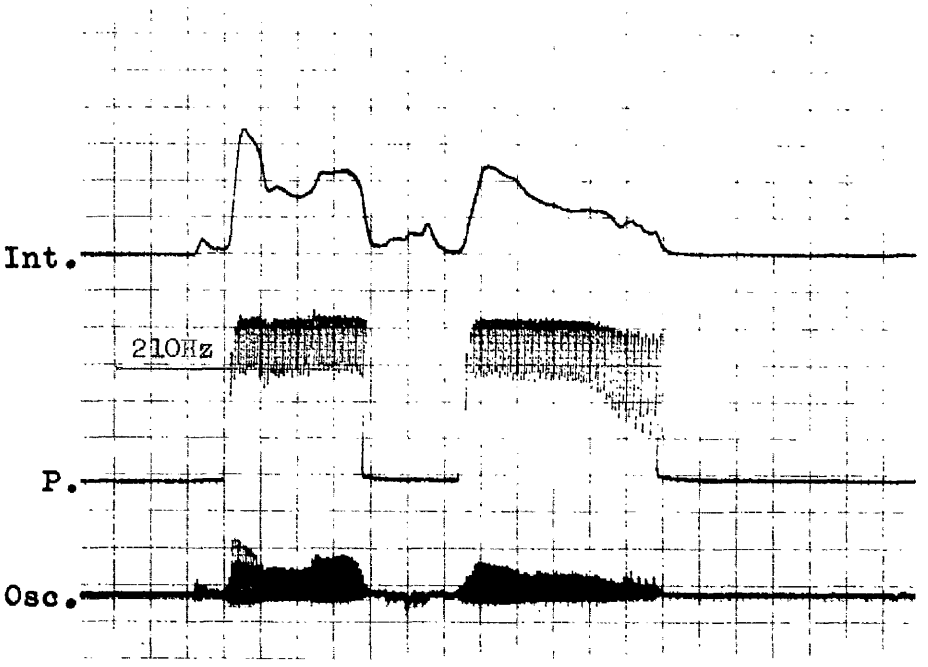


Figure 8.13 (g) & (h)



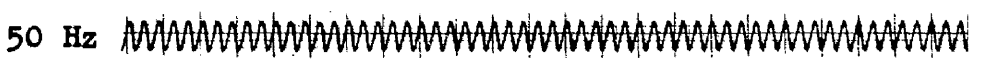
(g) / taa ˇkhaaw ˇkhaaw/

" Whitish coloured eyes."



(h) /ˇ khaw ^ maj ^tchɔɔp/

" He didn't like it."



(22) $[+\text{lowT}] \longrightarrow \begin{bmatrix} +\text{lowT} \\ +\text{modify} \end{bmatrix}$

(23)

$[+\text{lowT}] \longrightarrow [+\text{highT}] / \_\_\_\_\_ [+\text{highT}]$ in unaccented syllables.

Rules (21) and (22) are in a disjunctive order with rule (23). Thus [+lowT] which is the out put of (21) will under go rule (22) and become $\begin{bmatrix} +\text{lowT} \\ +\text{modify} \end{bmatrix}$ but not rule (23).

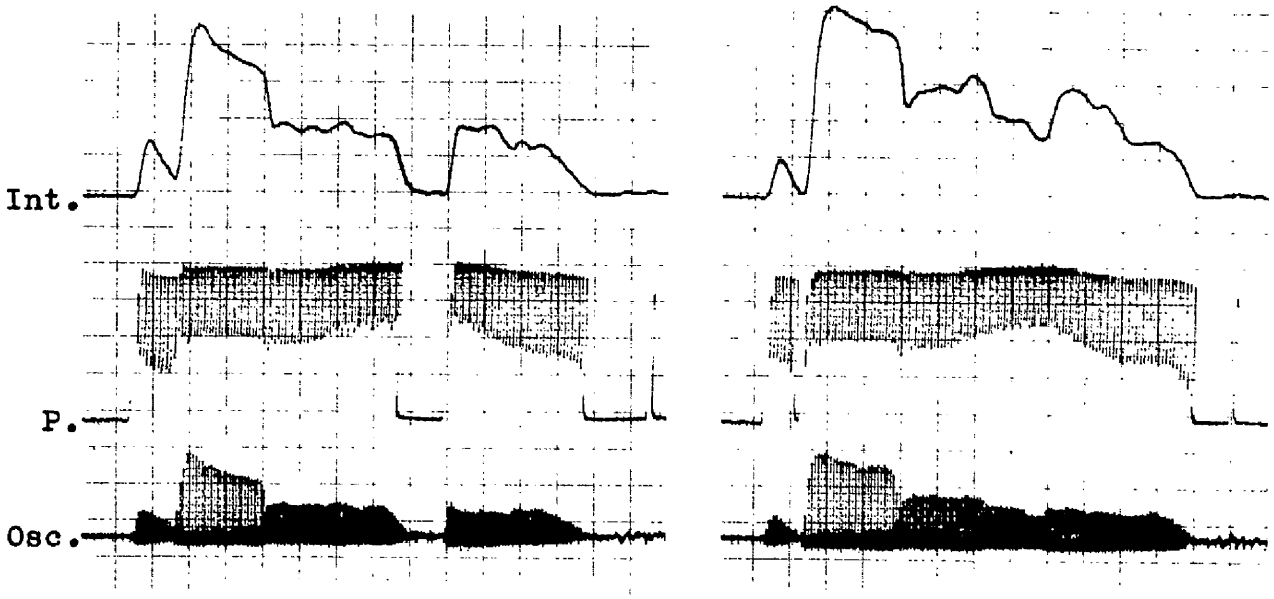
After the operation of either rules (21) and (22), or rule (23), rule (17) on p. 178 will delete all but one pitch height in an unaccented syllable.

In Chapter VII, we mentioned that in the Prestissimo style, unaccented syllables with a final nasal lost its syllabic nucleus while the final nasal became [+syllabic] (see p. 137). In this case, the pitch height of the unaccented syllable is assigned, not to the syllabic nucleus which has been deleted by rule (29) on p. 137, but to the syllabic nasal. Fig.8.14(a) and (b) on p. 190 - 191 illustrate the pitch contours of the utterances (a) / dii ˇmuan kan / and (b) / kin ^taŋ naan / spoken in Allegretto, Presto and Prestissimo styles.

Another pheno-menon mentioned in Chapter VII is the loss of unaccented syllables of the type V? in the Prestissimo style (see p. 134-5) since the syllabic segment in that syllable loses its syllabicity. An example for this pheno-menon is shown in Fig. 8.14(c) p.192 which illustrates the pitch contours of the utterance /ˈmiʔ ˋthuʔ naa / spoken in Allegretto, Presto and Prestissimo styles. Although the syllabic nucleus has lost the feature [+syllabic], the segment is still present (but is [-syllabic]). In this case, the pitch height of that unaccented syllable is then assigned to the non-syllabic vowel.

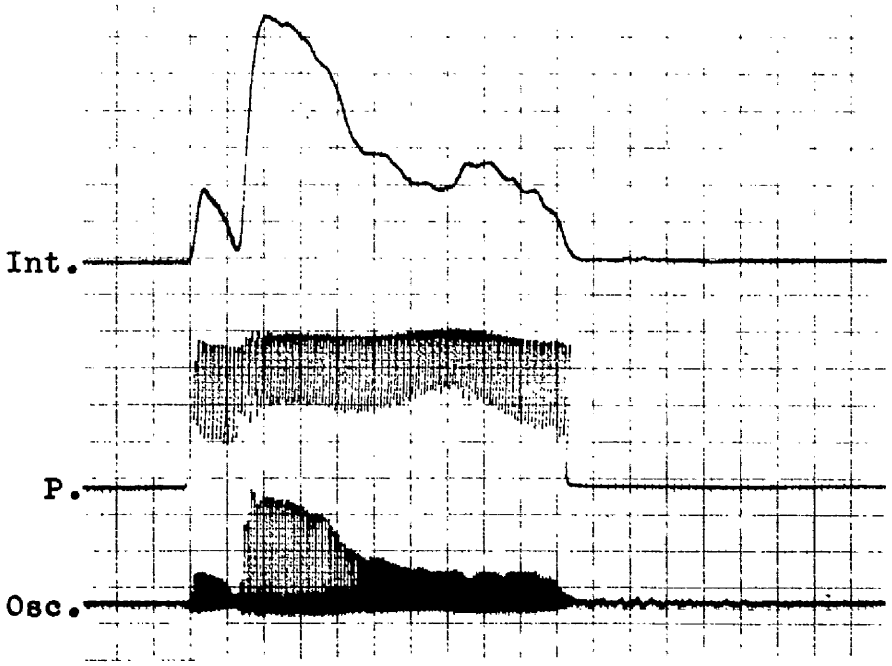
Figure 8.14 (a)

Pitch contours of utterances spoken in different styles.



(i) Allegretto : [dii muan kan] (ii) Presto : [dii mmannan]

(a) / dii ˇmuan kan /
"Perhaps, it's better. "

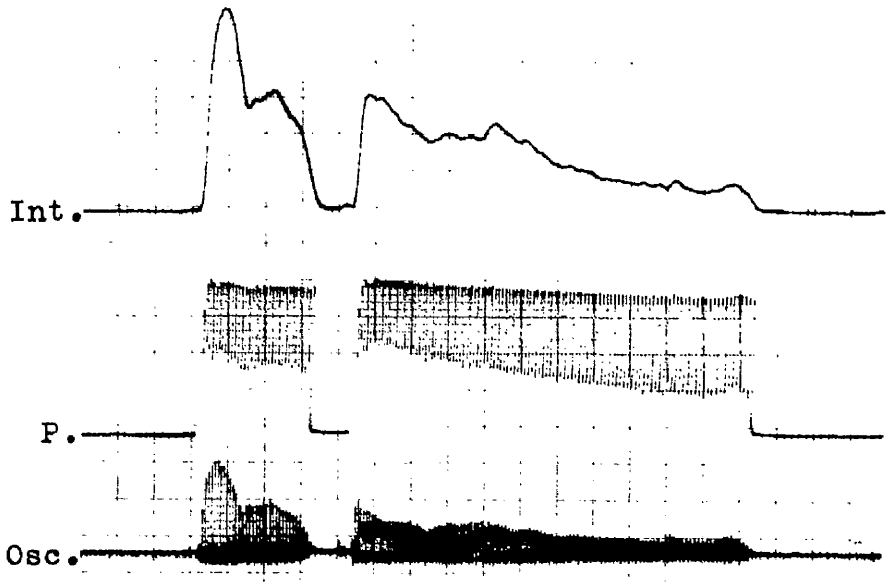


(iii) Prestissimo : [dii mn ŋn]

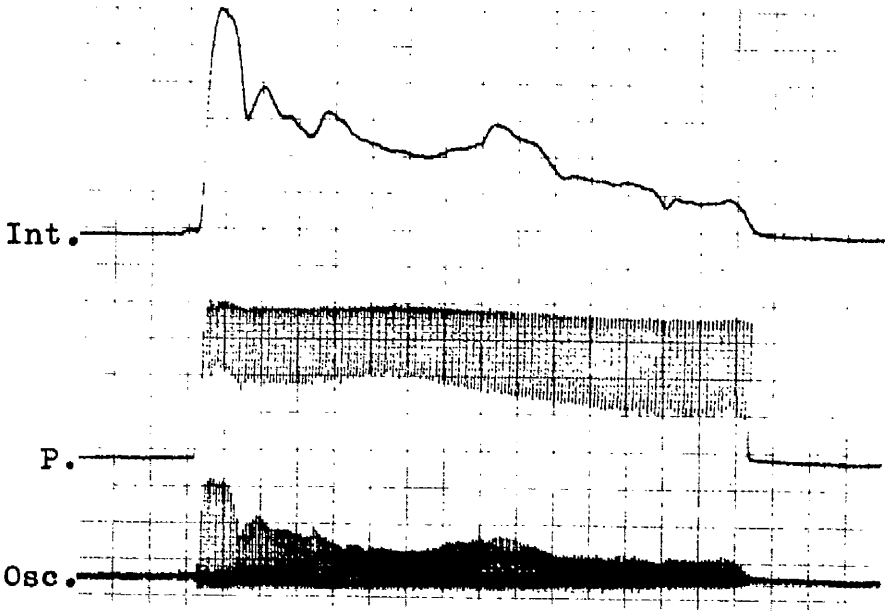
50 Hz

(b) / kin tan naan /

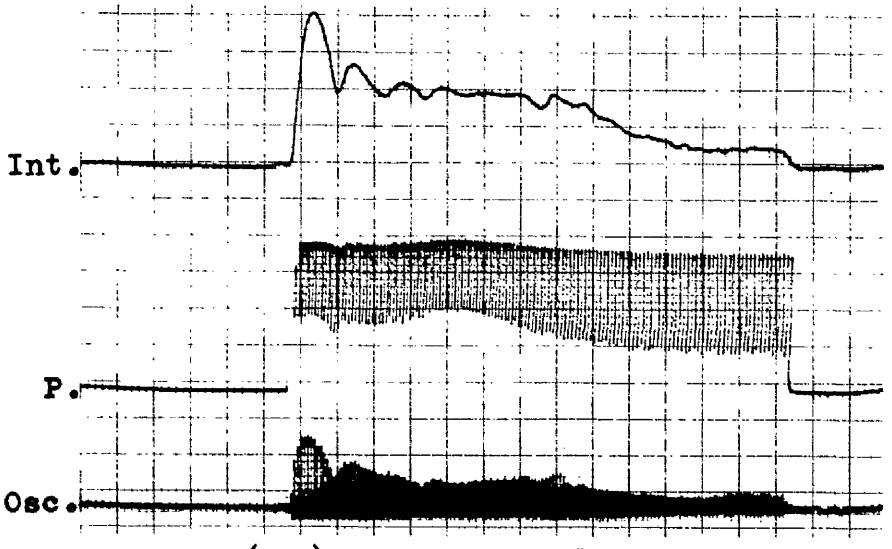
" (He) took some time to have a meal."



(i) Allegretto : [kin tan naan]



(ii) Presto : [kin nan naan]



(iii) Prestissimo : [kinn naan

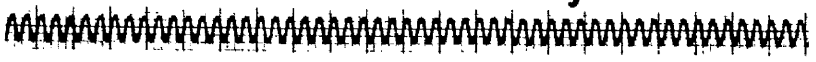
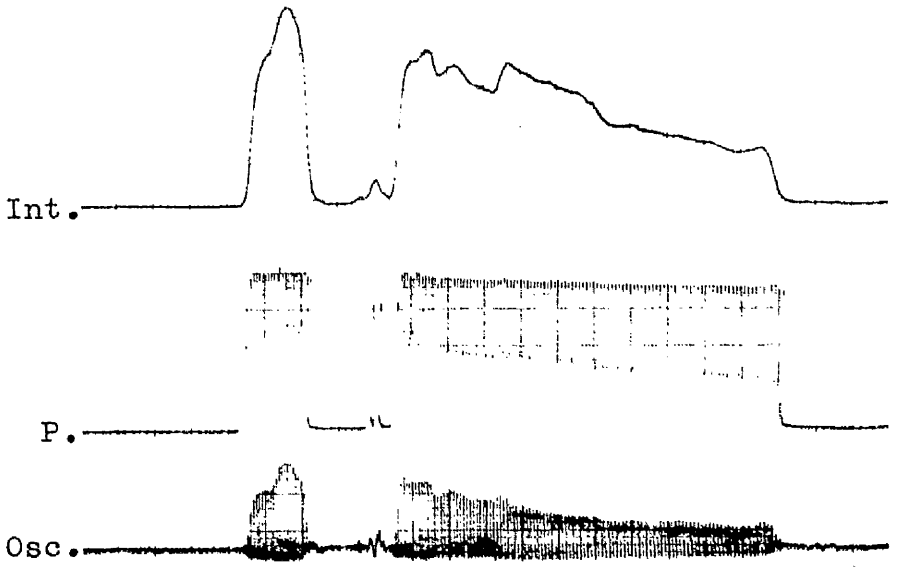


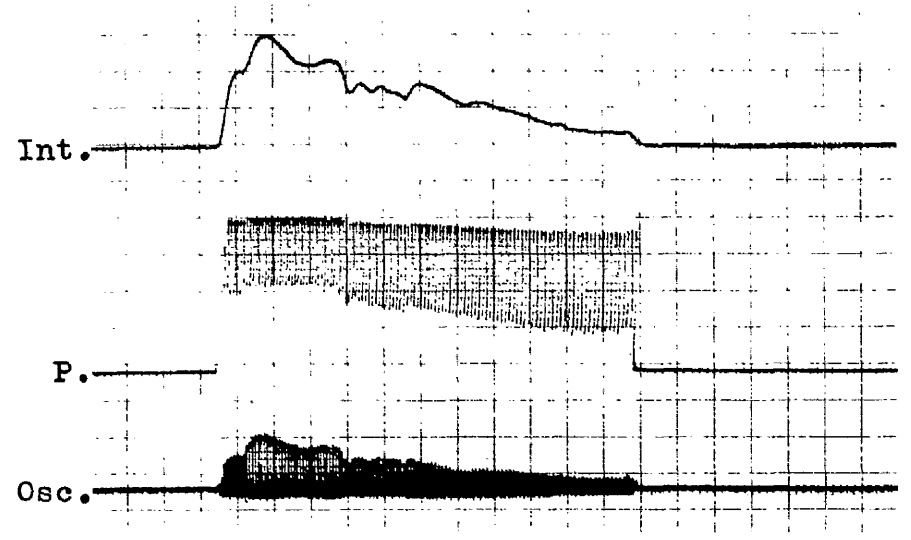
Figure 8.14 (c) (c) / ˈmi? \thu? naa /

" June."

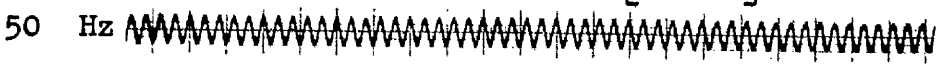


(i) Allegretto : [mi thu **naa**]

(ii) Presto : [mi hu naa]



(iii) Prestissimo : [miwnaa]



Summary

The changes in the pitch contours of unaccented syllables may be described by a summary of the foregoing rules :

I (16)

$$[+\text{lowT}] \longrightarrow \begin{cases} [-\text{lowT}] \Big/ \begin{cases} \# \quad \overline{V} \quad \begin{bmatrix}-\text{cons}\\-\text{son}\end{bmatrix} \quad \# & \text{(a)} \\ \# \quad \overline{V} \quad \begin{bmatrix}-\text{cons}\\-\text{son}\end{bmatrix} \left(XY \quad V \begin{bmatrix}-\text{sons}\\-\text{son}\end{bmatrix} \right)^{*} WZ \quad \underset{[\text{Accent1}]}{V} \quad \# & \text{(b)} \end{cases} \\ [+\text{modify}] \Big/ \begin{bmatrix} V \\ \text{Accent } n \end{bmatrix} \begin{bmatrix}-\text{cons}\\-\text{son}\end{bmatrix} & \text{(c)} \end{cases}$$

Where $n \leq 3$

II (18)

$$[+\text{HighT}] \rightarrow [-\text{highT}] \Big/ \begin{bmatrix} \overline{V} \\ \text{Accent } n \\ -\text{proper } n \end{bmatrix} \begin{bmatrix}-\text{cons}\\-\text{son}\end{bmatrix}$$

Where $n \leq 3$

III (19)

$$\begin{bmatrix}+\text{highT}\\-\text{properN}\end{bmatrix} \longrightarrow [-\text{highT}] / \# \quad \overline{V} \begin{bmatrix}-\text{cons}\\-\text{son}\end{bmatrix}$$

[Incorporated already in (18)]

IV

$$[+\text{lowT}] \longrightarrow [+\text{high T}] / [+\text{highT}]\_\_\_\_ \quad \text{in unaccented syllables} \qquad (20)$$

V(i) (21)

$$[+\text{highT}] \longrightarrow [+\text{lowT}] \Big/ \begin{cases} \# \ [-\text{voiced}] \ [+\text{lowT}] \ \_\_\_\_ \ XY \ \underset{[\text{Accent1}]}{V} = & \text{(a)} \\ \# \ [-\text{voiced}] \ [+\text{lowT}] \ \_\_\_\_ \ \text{in completly redup. forms} & \text{(b)} \end{cases}$$

(ii) $[+\text{lowT}] \longrightarrow \begin{bmatrix}+\text{lowT}\\+\text{modify}\end{bmatrix}$ (22)

VI $[+\text{lowT}] \longrightarrow [+\text{highT}] / \_\_\_\_\_ [+\text{highT}]$ in unaccented syllables (23)

VII

$$\begin{bmatrix} \alpha\ \text{highT} \\ \beta\ \text{lowT} \\ \gamma\ \text{modify} \end{bmatrix} \longrightarrow \emptyset \Big/ \begin{bmatrix} \alpha\ \text{highT} \\ \beta\ \text{lowT} \\ \gamma\ \text{modify} \end{bmatrix} \_\_\_\_\_ \quad \text{in unaccented syllables} \qquad (17)$$

Footnotes VIII

1. Abramson A.S." The vowels and tones of standard Thai", IJAL 28,II (1962) p. 126-127.
2. In fact, it is possible to have a falling tone on this type of syllable. See Introduction on p. 21-22.
3. c.f. the author's criticism of Woo's theory on p. 22-24.
4. Reproduced from Table 3.3 on p. 170 of N.H. Woo's"Prosodies and Phonology" (1969)
5. N.H. Woo, " Prosodies and Phonology " p. 241.
6. A.S. Abramson (1962) p. 120 - 124.
7. H.A. Whitaker, " Stylistic tone changings rules in spoken Thai ", Glossa 3.2. (1969) p. 190 - 197 .
8. E.J.A. Henderson, " Prosodies in Siamese " Asia Major, new series 1 (1949) p. 189 - 215.
9. The native proper names are always monosyllabic, e.g. / dɛɛŋ/* " Dang" / phlɔɔj /* " Phloil ".
10. By Convention I , see p. 151.

SUMMARY

We may come to a conclusion that accent in Thai is predictable and that it has two functions in the language : the syntactic function and the interpretative function. The syntactic function has been illustrated by the success of the recognition test, the result of which has shown that different accentual patterns on the same phonological representation would induce different intrepretations. The interpretative function of accent has been described in the last three chapters where the phonetic correlates to the various degrees of accent are given in terms of the difference in the length of the segments, and the changes in segmental and pitch features from the specifications of lexical items as given in the lexicon, when the lexical items in question bear different degrees of accent.

On the whole, the result of the recognition test (as given in Chapter III) using 35 pairs of utterances, each of which is contrastive with the other utterance in the pair by its accentual pattern, has provided the expected answer as predicted by the accent placement rules. However, the following individual utterances have failed to produce the expected result:-

4A /ˊrak ˇsaa khon^{3} tcon^{1} ˇhaaj / "(He) has cured a poor man."

5A /ˋkaj^{3} ^baan^{1} ˊnan ˋʔɔɔ kˋkhaj ˋdok/ "Domesticated chickens are fertile."

10A /^phuuˊ^{4} raaj^{2} ^taaŋ^{4} ˇkhaŋˊ^{1} naʔ / " He is a dangerous criminal."

14A /ˇkhawˋ kepˊ wajˇ laŋ^{2} ^tuu^{1} / " He kept it on top of the cupboard."

29A /ˇkhaw thamˋ ʔaʔ raj kanˋ juu ^khaaŋ^{3} ^baan^{1}/ "What are the neighbour doing?"

11B /ˇkhɔɔ^{1} ŋˇphom^{3}ˋ juu naj^tuu / " My belongings are in the cupboard."

14B /ˇkhawˋ kepˊ wajˇ laŋ^{1} ^tuu^{1}/ " He kept it behind the cupboard."

19B /^naaˊ^{1} rɔɔ^{1} n^maj mii lom/ " It is likely to be hotsince there is no breeze."

23B /ˇkhaw^naa^{3} ˇ^{1}muan khraj / " Him, who does be look like ?"

One can account for the failure of some of these utterances. Utterance 11B which contrasts with utterance 11A: /ˇkhɔɔ^{3} ŋˇphom^{3}ˋ juu naj tuu / "Mine are in the cupboard." may have failed to produce the expected answer

because the semantic interpretation of "mine" and "my belongings" is in fact the same. Since the subjects were not conscious of accent being the cue, some of them may have connected the utterance they heard to the first meaning that fitted i.e. 11A.

The contrast between utterance 23A /′khaw^naa˅m uuan khraj/"Of whom does his face remind one?" and 23B /˅khaw^naa˅m uuan khraj/ "Him, who does he look like?" is in fact not contrastive at all in terms of accent; since both lexical items underlined have the accentual pattern 3 1. However, /˅khaw / in 23B has a rising tone while /′khaw/ in 23A has a high tone. What the author was trying to find out, in using these two utterances was : whether the high pitch which is the result of a pitch assignment rule on unaccented syllables with a rising tone (i.e. /˅khaw/ "he") is or is not contrasted by the native speakers with the pitch of the lexical high tone, espectially the pitch of the unaccented high toned syllables (i.e. /′khaw/ "face"). Judging from the results of utterances 23A and 23B, it seems as if they are not contrasted. However, there is a cue for distinguishing the two utterances; for /˅khaw/ in 23B was spoken with a slight pause which made the syllable slightly longer than /′khaw/ in 23A; and this may account for the fact that some of the subjects were able to distinguish the two utterances.

Utterances 14A and 14B require some comment here since they produced a complete failure, that is utterance 14A produced an equal number of A responses and B responses, and utterance 14B also produced an equal number of the B responses and the A responses. With this result, it seems quite certain that the two utterances must be non-contrastive; and that /˅laŋ^tuu/ " the top of the cupboard" in 14A and /˅laŋ^tuu/" behind the cupboard" in 14B are ambiguous with the accentual pattern 2 1, and not 2 1 for /˅laŋ^tuu/ in 14A, and 1 1 for /˅laŋ^tuu/ in 14B. The locative phrase /˅laŋ^tuu/ "behind the cupboard" in 14B seems also to have become a compound. The subjects' memory may have played a great part in equalling out the number of responses in spite of the author's attempt to eleminate this (see p. 45) . What is likely to have happened is that the subjects remembered which

response they first gave when one of these utterances was played; and, knowing that the two utterances were supposed to be contrastive, automatically gave the other response when they heard the other utterance. The author, in trying to get the subjects' natural response, has withheld the information that each of the two utterances is supposed to be contrastive by the accentual pattern; and the subject were only instructed"to choose the meaning which they thought corresponded with the utterances they heard." Since the accentual patterns of 14A and 14B are non contrastive to them, their response did not rely on the accentual patterns they heard,(which is 2 1 for 14A and 1 1 for 14B), but on what they expected to hear.

The author has not been able to offer any explanation for the failure of the other 6 utterances. Some of these utterances are contrastive acoustically, in terms of duration alone (as opposed to other types of contrast which also involve changes in segmental and pitch features). On the other hand, one must admit that a test of this type is a test of the performance as well as the competence of the native speakers who are not infallible nor always attentive. The successs of the test as a whole has been shown to be so great that the author feels one may attribute the failure rate of 8.5% (i.e. 6 out of 70) to human imperfection.

TABLE OF ILLUSTRATIONS

APPENDIX

by A.W. Stone.

The instruments used for the reproduction of the instrumental illustrations shown in this thesis were as follows :

(a) the FRØKJÆR-JENSEN TRANS. PITCHMETER

(b) the FRØKJÆR-JENSEN INTENSITY METER
linked to :
the ELEMA - SCHONANDER MINGOGRAF - 800 which is the "writing" instrument.

(c) the Kay Sound Spectrograph.

These instruments may be briefly described as :

(a) The pitch meter is an instrument for converting varying frequency (pitch) into varying D.C. Voltage; the lower frequencies converting to a progressively greater voltage as the pitch falls, and conversely, a lesser voltage for the higher frequencies. This has the effect of deflecting the ink-jet on the Mingograph (see below) to produce a series of lines longer for lower frequencies and shorter for higher; reading from the bottom of the illustration. A calibration 'grid' is included for measuring purposes.

(b) The intensity meter also produces a varying D.C. Voltage proportional to the degree of energy contained within the word or phrase; showing higher 'peak' in decibels for the greater intensity. A calibration 'grid' in decibel is included.

The lower illustration is a DUPLEX OSCILLOGRAM which differs from the conventional oscillogram in that the higher frequencies such as obtained in sibilants, fricatives and plosives, are converted within the pitch meter to negative pulses, which show on the mingograph as downward (negative) excursions, allowing much easier identification of these segments.

The Mingograf - 800 is an ink-writing oscillograph employing ink-jet Glavanometers which "write" their excursions on a moving folded shart paper. Up to eight channels can be recorded simultaneously and paper speed varies over a wide range between 2.5 mm. and 1000 mm. per second. A speed of 100 mm. per second was used throughout this thesis. Time markers of 1 second duration and 50 Hz are available, the latter being used in these examples.

(c) The sonograms shown in this thesis were made on the Kay Sound Spectro-

graph (Sonograph). This is an instrument for making a visual display of sound material within the sound spectrum between 80-8000 Hz. The frequency is read in the vertical plane and the "time" in the horizontal. A maximum duration of 2.4 seconds can be analyzed at one time, determined by the length of paper mounted on the drum. In the model used, the maximum upper frequency registered is in the region of 7250Hz. due to the slightly raised "base-line" (80Hz), adjusting to show a mirror- image effect, to facilitate easy identification of the exact position of this line.

Degrees of energy contained within the sample are shown by varying intensity of the marking, between light-grey and intense black, the darker trace representing the most energy. The calibration grid enclosed allowed identification of frequency and time at any given part of the trace.

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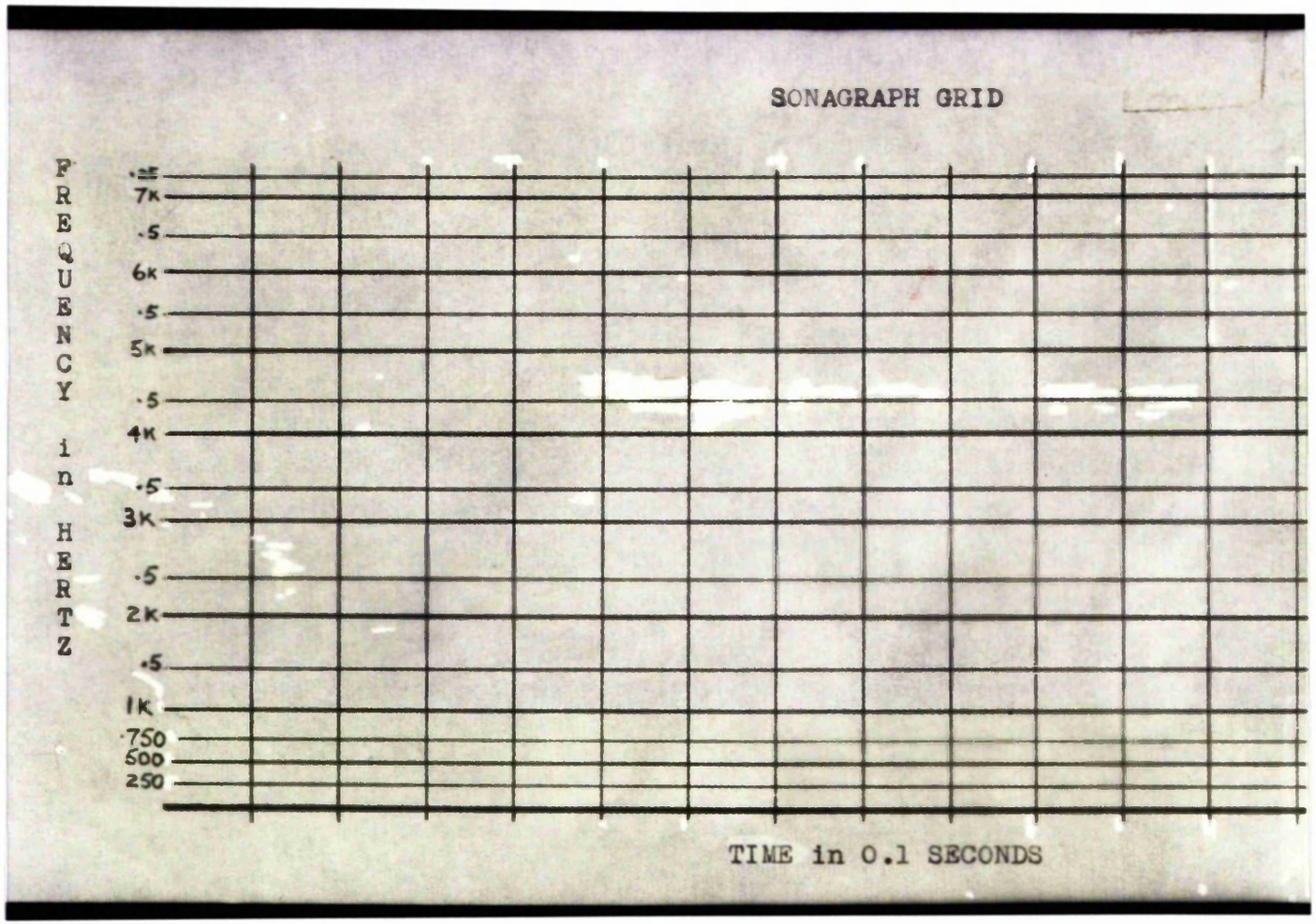
SUBJECT INDEX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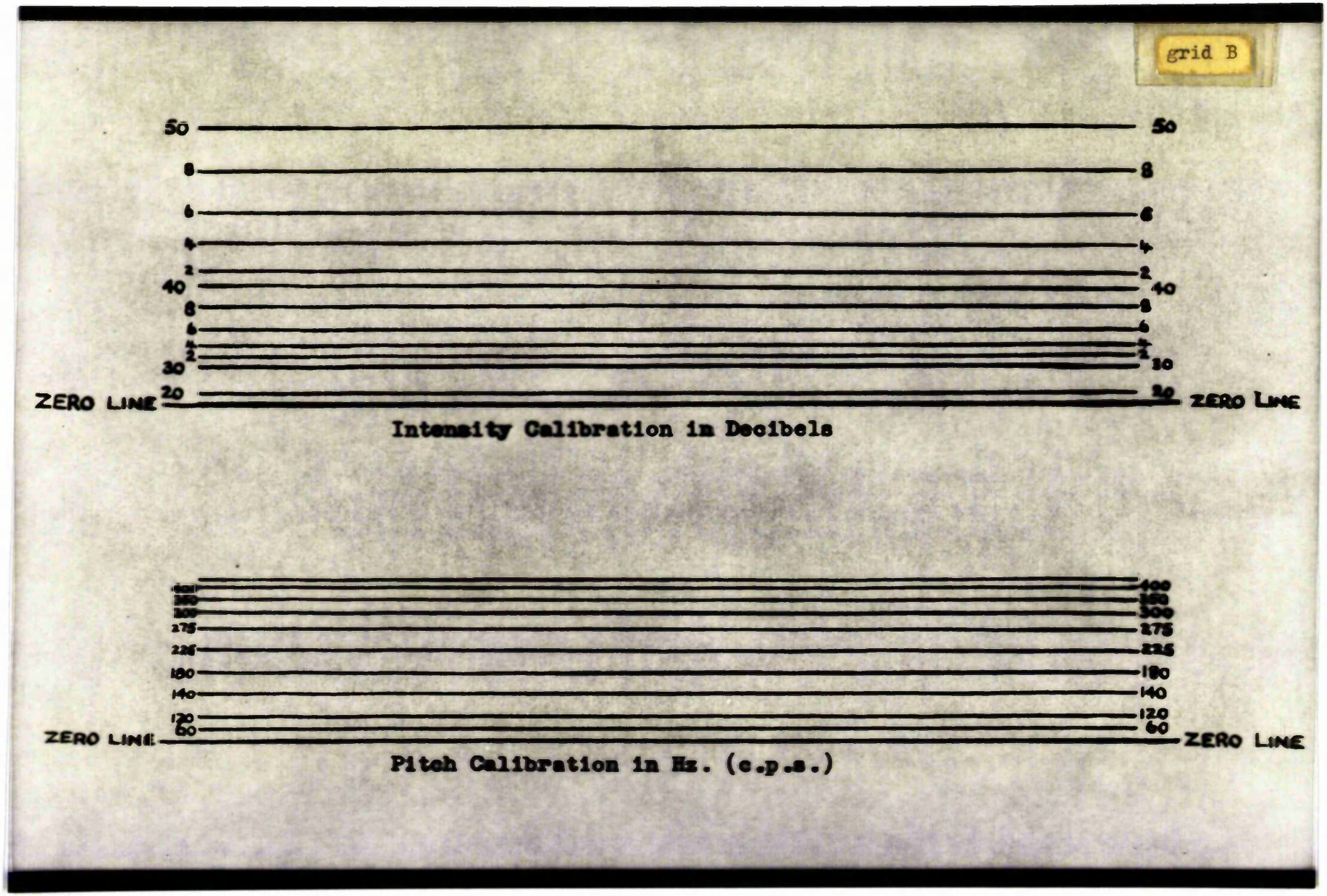
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Pitch Calibration in Hz. (c.p.s.)